REPORT RESUMES

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UHF TELEVISION CHANNEL ASSIGNMENT PLAN. REPORT OF THE NAEB STUDY TO DEVELOP A UHF ASSIGNMENT PLAN USING DIGITAL COMPUTER METHODS.
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REPORT NUMBER NDEA-VIIB-292-5 PUB DATE OCT 63
CONTRACT OEC-2-16-027
EDRS PRICE MF-$0.27 HC-$5.32 133P.

DESCRIPTORS- *TELEVISED INSTRUCTION, *EDUCATIONAL TELEVISION, TELEVISION, *BROADCAST TELEVISION, OPEN CIRCUIT TELEVISION, TELEVISION SURVEYS, TELEVISION RESEARCH, *COMPUTERS, COMPUTER PROGRAMS, DISTRICT OF COLUMBIA, FEDERAL COMMUNICATIONS COMMISSION (FCC)

THE PURPOSE OF THIS STUDY WAS TO DEMONSTRATE THE EFFICIENCY AND EFFECTIVENESS OF USING DIGITAL COMPUTER METHODS TO ESTABLISH AN ULTRAHIGH FREQUENCY UHF ASSIGNMENT PLAN. THE STUDY FOLLOWS UP A PREVIOUS NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS (NAEB) SURVEY WHICH INDICATED THE NEED FOR FUTURE EDUCATIONAL TELEVISION CHANNELS BEYOND THOSE AVAILABLE UNDER THE EXISTING TABLE OF ALLOCATIONS. A PROPOSED TABLE OF ASSIGNMENTS WAS DEVELOPED THROUGH THE USE OF THE COMPUTER. IT IS DESCRIBED AS ONE OF THE BEST ARRANGEMENTS POSSIBLE, PROVIDING EQUITABLE SERVICE FOR ALL TELEVISION BROADCAST NEEDS. OVER TWICE THE NUMBER OF USABLE CHANNELS HAVE BEEN ADDED TO THE FEDERAL COMMUNICATIONS COMMISSION (FCC) TABLE OF ASSIGNMENTS. THE NAEB RECOMMENDED THAT FCC ADOPT THE NEW TABLE OF ASSIGNMENTS, WITH THE UNDERSTANDING THAT THE RESERVED CHANNELS IN THE REPORT PROVIDE ONLY FOR MINIMUM EDUCATIONAL NEEDS. THE NAEB REPORT ALSO RECOMMENDED THAT THE FCC ACCEPT THE RECORDED DATA, WHICH ARE AVAILABLE FOR THE COMMISSION'S USE, AND THAT THE INFORMATION BE USED AS THE BASIS FOR PERIODIC REEXAMINATION AND POSSIBLE REALLOCATION OF UNOCCUPIED CHANNELS. (JC)

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REPORT OF THE NAEB STUDY
TO
DEVELOP A UHF ASSIGNMENT PLAN USING DIGITAL COMPUTER METHODS

NAEB

NATIONAL ASSOCIATION OF
EDUCATIONAL BROADCASTERS
WASHINGTON, D.C.

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National Association of Educational Broadcasters
Washington, D.C.

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October, 1963

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SUMMARY OF THE REPORT

Due to the increasing and varied demand for the use of frequencies in the radio spectrum, the Federal Communications Commission has felt the need to re-examine the general distribution of television channels in its Rules and Regulations, especially in the UHF area of the television spectrum.

Heretofore, all examinations and alternative considerations have been provided by a manual process requiring long months of study. This method is severly limited by the sheer magnitude of the number of man hours required, and the purely physical limitation to consideration of all mathematical alternatives.

As a national Association working closely with the Federal Communications Commission, the NAEB, at the request of the former Chairman of the Commission, undertook an exploratory study of the UHF spectrum in 1962. The purpose of the study was to determine the feasibility and practical economics of using digital computer methods for developing a television channel assignment plan. Such a system, it was suggested, would assure that all mathematical alternatives could be given due consideration and that a precise and efficient Table of Assignments could be devised.

The preliminary study proved that this was a practical, economical, and accurate approach. As a result of its study of the preliminary report, and at the request of the FCC, and in consultation with members of its professional staff, the NAEB undertook the development of a UHF assignment plan which would include all international agreements, all the pertinent FCC Rules and Regulations, and all other constraints resulting from existing facilities.

The study has now been completed and reflects planning for commercial potential as it relates to population distribution, as well as consideration of established educational needs.

In developing this Table of Assignments, existing and assigned VHF facilities were integrated in order that assignments in the UHF spectrum would be made in the context of the entire allocation pattern.

The procedure used by the computer began with the distribution of the lowest UHF channels rather than the highest. Although the computer could have been instructed to begin assigning at any point in the UHF spectrum, on balance it seemed desirable, in view of the present state of the equipment art, to begin at the low end rather than the high end of the UHF band. Because of the decision of the Federal Communications Commission to provide Channel 37 for non-broadcast purposes in the immediate future, this channel does not appear anywhere in the Table of Assignments.

The result of this precise mathematical approach, in an electronic digital computer system that has the capability of presenting and considering numerous potential alternatives, is a combined UHF-VHF television allocation plan with 3219 channels. The number of channels, however, is not the significant factor here. The important fact is that these channels have been placed precisely where they are needed, and the most usable frequencies of the spectrum have been distributed with greater efficiency than has heretofore been possible.

If it were the purpose of this study to completely exhaust the possibilities of channel assignments in the spectrum regardless of the geographical location and public need, it would have been possible to substantially increase the number of channels that could be made available. Because the computer was not allowed to saturate channels, there is still flexibility remaining in the assignment plan.

The distribution system used by the computer in this plan has built in an additional measure of flexibility because the actual distances established between assigned channels are greater than the minimum required separations. To the required separation a flexibility factor of two miles was added in the case of separations between an assignment and an operating station, and a factor of five miles was added in the case of separations between assigned channels. Thus, the area of flexibility surrounding each pair of established geographical co-ordinates has a minimum radius of two miles, although on the average, due to the variability of distances between locations, there is a greater flexibility.

The additional result of this study has been that the NAEB has now compiled data, on magnetic tape, for 1596 separate locations in the United States, covering nearly all the inhabited areas of the country. These data indicate concentrations of population, relative sizes of communities and service areas, shared uses by contiguous political subdivisions, and the engineering rules and regulations of the FCC, including all the required co-and adjacent channel separations and the various "taboo" separations.

These data are permanently recorded and available to the Federal Communications Commission and the educational community at any time for the calculation of any modification or readjustment of the assignment pattern. By using this information it is possible to determine within half a mile the precise allowable relocation of any assigned channel or the rearrangement necessary in any affected group of channels.

After adding to the computer program information regarding desired objectives, within a period of one to three hours nearly any calculation of this type can be thoroughly and precisely completed and evaluated. This is clearly a distinct advantage to any future allocation considerations of the Commission for any contingencies or special needs that may arise.

If the Table attached to this report or its approximate replica were to be adopted, the computer programs based on the information which was used in preparing the Table, would save the Commission many hours of unnecessary study, argument, and hearing and would effectively resolve possible engineering disputes.

This information and the program built around it are recorded for instant retrieval and application. They are available to the FCC, with the full cooperation of the NAEB, to effect any modification the Commission may desire. A detailed description of the Assignment program is presented in the attached Appendix.

On the basis of its study, the NAEB is recommending to the Federal Communications Commission that it adopt the NAEB Table of Assignments as a new basic Table, and that it adopt the reservations which are included in that Table. It is also recommended that the Commission consider the reserved channels in this report as providing only for minimum educational needs. The NAEB has also made the recorded data available to the Federal Communications Commission with the recommendation that it be used as the basis for a periodic re-examination and re-allocation of unoccupied channels in the UHF spectrum. Details of these recommendations are listed on pages 34 and 35.

I

INTRODUCTION

The use of the radio spectrum is constantly changing because of varied and increasing needs. Each change demonstrates that it is becoming increasingly difficult to meet the demands of civilian and military use with the available frequencies. Because of this, it is imperative that every area of the spectrum be used as efficiently as possible.

Television channels, in particular, are the subject of special concern, and even now there is in effect a regulation that one set of frequencies used for a television channel be allocated for other purposes. Such a practice is not without its value and serves to underline again the need to use television frequencies wisely and efficiently. Although there are many reasons to continue the basic number of channels now provided, the potential uses for other purposes do demonstrate that these resources are in constant demand not only by telecasters, but by others with radio frequency needs.

Commercial television broadcasting has already been characterized as one of the nation's fastest growing industries. This is true, not only because there is a profit to be made in operating a channel, but because many other services for programing, engineering, evaluation, advertising, and research are so closely tied to the broadcasting industry. While commercial broadcasters have not as a whole been able to operate profitable UHF facilities in markets which are intermixed with VHF and UHF channels, this will soon be a problem of the past and the availability of all-channel receivers in homes will make it desirable for investors to consider operation of a television facility in locations where before it was almost certain to be a loss.

Educational television stations, too, are increasing in number, and the needs of education present an additional demand for television channel allocations. While some observers feel that educational television has grown slowly, too slowly perhaps, it must be emphasized that starting an educational television facility is not just a matter of putting a station on the air. Problems of financing, operation, control, and programing are vastly different between educational and commercial television stations.

To develop educational television is to develop education itself, and this does not usually happen with great dispatch. Apart from this, the financial burden with which most educational station operations have begun is far more difficult than even the most adventurous commercial station operators would tolerate. How many commercial television operations would we have if the means of financing were not provided by the commercial system itself?

For educational television station operators, there is not only the imminent availability of the all-channel reciever, but the appropriation of federal funds specifically for building and enlarging educational television facilities. This, with the local and state money which it will cause to be available, means that at the very minimum more money will be spent on educational television station construction in the next five years than is now spent for operating purposes in a single year. One can easily see the demands which this will make on available television frequencies.

The NAEB has long been aware of these spectrum needs and in 1962 conducted a pioneer study to determine the feasibility of using computer techniques to increase the number and improve the distribution of television channels across the nation. An experimental study by NAEB[1], supported by the U.S. Office of Education and at the request of the Chairman of the FCC, demonstrated that this technique could effect an improvement in the allocation pattern for UHF channels, that area of the spectrum which is least used and most flexible.

Because the experimental study was not designed to include all the variables which are necessary for a fully practical Table of Assignments, the NAEB undertook to develop a program which would result in such a Table. In this case, full consideration was given to channel constraints which derive from international agreements with Canada and Mexico, a system of priorities which was prepared in consultation with FCC engineers and up-to-date information on present and future educational needs for television frequencies. This report describes this effort and presents the Table of Assignments which resulted.

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[1] NAEB, A Report of a Study of Nationwide Assignments of Television Channels for Maximum Service and Efficiency by the Use of Electronic Digital Computer Methods, Washington, D.C., 1962.

II

GENERAL ASSUMPTIONS AND BACKGROUND

Assignment of television channels is a highly complex matter and cannot be done without immediate concern for a variety of needs and the limited resources available to meet them. There are, of course, a number of approaches which could be developed as a rationale for assignment procedures, and after careful and thoughtful review of these alternatives, the NAEB has based its work on the assumptions which follow.

AN ASSIGNMENT PLAN MUST BE A BEGINNING AND NOT AN END

Needs and requirements for the future can only be specifically identified on a limited basis. Beyond a certain point the projection of needs as well as constraints must necessarily be in some measure speculative, and therefore subject to limitations. In developing an efficient table of television channel allocations, this problem of uncertainty about the future affects all broadcasting interests--commercial as well as educational. Understanding this, it is doubtful that any allocations table, by whomever developed, can be considered as a "plan for all times," subject only to sporadic changes and variances for the sake of expediency.

Until now such a plan has been accepted as more or less inevitable. Having a set of rules, laid down by adoption of the Table of Assignments, would, with such a plan, practically eliminate the need to make further major decisions regarding the location and use of television channels. The rules would, in effect, be the decisions--made now for all future needs and considerations.

The application of digital computer techniques to the problem of efficient nationwide channel allocations has made a new approach feasible and economically practical. It is now possible and altogether reasonable to consider the new assignment plan which will be adopted by the Commission as a new and better base from which to operate. It offers an opportunity for the Commission to meet the contingencies of the future without violating sound technical principles, or neglecting legitimate needs.

The inevitable changes in technical developments for UHF operation, the need to add channels in specific locations as they become important, and the changing allocations picture as each new station goes on the air and each new UHF transmitter is precisely located, clearly indicate the importance of flexibility and the need to re-examine the full table of allocations periodically.

EDUCATIONAL NEED IS AS IMPORTANT AS COMMERCIAL INTEREST

Here is a distinction which, frankly, is not very well understood. The active history of commercial broadcasting in this country has led quite naturally to a way of thinking about television which is more confining than broad and more misleading than helpful. Because commercial broadcasters by necessity operate according to rigid time schedules and within established program concepts, it is often felt that educational broadcasters must follow the same procedure.

To be sure, within the rules and regulations of the Federal Communications Commission there are inevitably many similarities between both types of operation, but at the programing and operational level there are many differences and many varied approaches to educational and cultural needs. Commercial broadcasters use a mass medium to reach what is hopefully a sizeable portion of the mass with each program, while educational broadcasters use a mass medium to reach a much smaller portion of the mass, less frequently, and with a different purpose.

This assumption does not necessarily project dissatisfaction with commercial broadcasters or with the commercial system of broadcasting. Rather, it attempts to assay a wholly different concept in broadcasting, a new approach to serving people through a mass medium. It is not, as some have suggested, a waste of time to use a mass medium to reach anything less than a majority; it is often the only practical and effective way to reach widely scattered minorities, no less a mass in their own right, than large numbers of people watching a single program. In many instances, it is the only way that the increasing demands can be met for more and better education for more people at less cost.

The inability to grasp this concept often results in the attitude that there ought to be a channel for the "educators" but that commercial broadcasting is really more important, and that channel allocation procedures should favor unreserved channels so they can be available for commercial purposes if desired.

Years of experience with the use of radio and television for such purposes has translated commercial promotion into commercial "needs" which increase as the population increases. Put another way, however, this simply means that large population centers are able to support larger numbers of commercial television stations; there is consequently a larger number of requests for television channels in such areas. This is not precisely a commercial "need" and it is improper to accord it such status.

At the same time, we confront educational needs, a topic which is so much with us that repetition of the problems of increasing enrollments, teacher shortage, school building inadequacy, re-training needs, curriculum expansion, teacher education, and all the rest hardly need to be detailed again.

What does need reiteration is that broadcast television has an unparalleled opportunity to assist in meeting these educational needs in a variety of ways. As the central school concept, the availability of school buses, improved textbooks and classroom audio-visual materials have effected important basic changes in the conduct of American education, so television offers the same kind of possibilities. It offers even more, for television is not only another and perhaps better way of presenting a lesson; it is a new way of improving and expanding the curriculum, of co-operative instructional planning--not just between the studio teacher and classroom teachers in one school system, but between the studio teacher and the classroom teachers in a combination of school systems throughout an entire community or region.

With all of its importance for economic growth and stimulation, commercial television is of course necessary and vital, but it is hardly of such pressing demand that educational need for television channels must be given secondary consideration when put face to face against commercial interests.

INSTRUCTIONAL TELEVISION REQUIRES BROADCAST AS WELL AS CLOSED CIRCUIT FACILITIES

Let us assume that television's total impact on education is yet to be realized, and for some areas it is still in the beginning of development;

there is, nevertheless, an increasing demand for television to meet existing and future educational needs. The question has been asked, "why can't educators use closed-circuit or the new point-to-point service available on the 2500 megacycle band?" The answer is quite clear.

Of course they can, and will; but for the most part, point-to-point service, whether closed-circuit or microwave radiation, must be considered for relatively small school systems or one or two schools operating co-operatively. Even with the growing interest in a "systems" approach to the application of various media to meet various educational needs, it is broadcast television that will continue to be in increasing demand to serve the prime educational needs throughout the country that can not be served in any other way.

The patterns of development of educational opportunities clearly indicate the need for educational television facilities that can be received in the home, the place of business, and the living quarters of students, as well as in the classroom and the adultorium. Only by the use of standard television broadcast channels can expanding school and college services be made available in continuing general education, off-campus junior and senior college courses, extension education, special technical education, and off-campus graduate school opportunities. All of these services are being developed in an increasing measure in all parts of the country.

As one reflects over the number of problems which school systems and colleges and universities share, it is reasonable to suggest that they also share some of the solutions. In several areas of the country, this is already being done. Where several schools have responded to the need for foreign language study at the elementary level, they have co-operated to present the basic course of instruction on television to schools over a wide area. In science, history, mathematics, and areas of special study, this is now gaining momentum and the need for public facilities which will permit public education to solve its problems co-operatively can be documented time and time again.

For any widespread and comprehensive program of co-operative instructional planning and presentation, a broad, flexible system of transmission and receiving must be available. Only broadcast television can make such a system accessible to a large number of schools and large numbers of widely-scattered students at a cost within the normal range of educational resources. These qualities of universality, flexibility, and financial feasibility make broadcast television the single most important and essential medium of educational transmission.

As school costs continue to mount, there is likely to be an even greater awareness of the economics of television. It is not so much a matter of cutting costs, for that is a near impossibility; but it is a matter of getting more and better education for the money expended. When television is applied to the solution of in-school and out-of-school instructional problems, it is broadcast television that will be most effective in meeting broad educational objectives in an economical way, and increasing educational opportunities at no significant additional costs.

Educational broadcast television is not simply a matter of providing cultural programs for the educated audience. It is a matter of extending the school curriculum beyond the school and into the home. The millions of people enrolled in correspondence courses throughout the country is only a small indication of the need and the interest which exists in the classroom for people who, except through broadcast television, can't be there. It is a matter of providing adequate curricula and adequate instruction in great areas that are deficient and that will remain deficient in a large measure unless adequate broadcast television can be made available. There is no doubt of education's need for educational technology, and among the media, broadcast television is a prime requisite.

RESERVATION PRINCIPLE IS SOUND

The principle and practice of government reservation of public resources for general public use and specific objectives is well established in the American system. It embraces such diverse resources as grazing lands, oil deposits, waterways and ocean beaches to the high water line. The list of such reservations is long and adds greatly to our national strength and security. The limited radio spectrum and the demands for its use make the application of the established reservation principle not only feasible, but essential.

The Sixth Report and Order of the Federal Communications Commission, in April, 1952, provided for the reservation of television channels for non-commercial educational purposes. The decision was based on testimony of many witnesses from educational institutions who identified their interest in the use of television for educational purposes and cited the nature of the problems involved in initiating and operating an educational television broadcast station.

These reservations were also predicated on the assumption that most American education is publicly governed, and derives its development and operating support, in whole or in part, from public tax funds. As such it is subject to the usual checks and balances of a democratic system, and consequently can not move or change as rapidly as an authoritarian institution. Therefore, its minimum basic needs must be permanently protected against wasteful exploitation.

At this date about one-third of the originally reserved channels have been activated, a disappointing number until one looks at the growth pattern. Since 1960, the number of educational television stations licensed to operate or start construction has shown a steady rise. The record since that time shows that approximately one half of the total number of stations now on the air were begun during that period and the number continues to rise as the educational needs and pressures continue to mount. Over twice the number of educational television stations now on the air are in the planning stage.

This is encouraging; but even if it were not so, the principle of reserving television channels for non-commercial educational purpose continues to be a sound one. Whether they are used immediately or in the next ten years, the principle of holding these in trust is as sound now as it was when the government provided for the land-grant college system under the Morrill Act in 1862. The need for that reservation was clear and the resources were held until such time as educational institutions could properly be developed and built. If it"tied up the land" or kept if from what might have been a nineteenth century shopping center, there is little doubt now that this was a wise procedure.

PROPOSED EDUCATIONAL RESERVATIONS ARE BASED ON MINIMUM NEEDS

The channels in the NAEB assignment plan that are proposed to be reserved for education are based upon the projection of the minimum needs of the total educational community over the next 10 to 15 years. It is not expected that these needs will remain constant but that they will change with the change in the concentration and nature of population, and with the imperatives of the total educational process in the various parts of the country.

In projecting the minimum needs for educational television broadcast channels, the special and possible uses of various types of closed-circuit and point-to-point television transmission were given full consideration.

Because of the probable change in educational channel demands and of possible unpredictable needs requiring additional channels at certain locations, it is emphasized that all unreserved channels should continue to be regarded as open channels subject to assignment by the FCC, and that all educational interests come before the Commission with equal rights of any other applicant to establish superiority of proposed service.

EDUCATIONAL RADIO'S HISTORY IS NOT A GOOD PREDICTOR OF EDUCATIONAL TELEVISION'S FUTURE

The difference between the history of educational radio and educational television is a crucial one and accounts for much of the interest in educational and instructional television that was never widely apparent for educational radio. While educational radio has contributed in important ways to education at all levels, it is seldom used as a basic instructional device. No doubt it will be, for television has already suggested to some practitioners that radio could perform certain functions as well as television--maybe better--and this will have its own stimulating effect on the growth of educational radio.

But its history, nevertheless, is different from educational television in its relationship to formal, direct instruction. To a large extent, this is apparent from the interest that foundations, the Federal Communications Commission, the Department of Health, Education, and Welfare and educators themselves have already demonstrated in educational television. While educational radio was broadly supported, the enthusiasm and the financial resources available to support it were never in such volume as are those for television.

Had there been funds specifically designated for building educational radio stations, and a government regulation that radio receivers shipped in interstate commerce must be capable of receiving AM and FM, educational radio's growth might have been a reasonable predictor of educational television's future. But the facts of the matter are sufficiently different that to make any such comparison between educational radio's and educational television's growth patterns is entirely inappropriate and erroneous.

EDUCATION IS NOT REQUESTING A PERCENTAGE OF TELEVISION CHANNELS

It has been suggested that education will have its needs satisfied if the Federal Communications Commission will reserve a certain percentage of the available channels for educational purposes. The suggested percentage varies from 20 to 50 per cent.

In some quarters the percentage approach to channel reservations for education has evoked interest as an easy way to solve a complex problem, rather than as a serious effort to meet both established and variable need.

A study of the entire allocations picture has demonstrated to the NAEB that there is less wisdom than promotional value in having a percentage of the television channels in the nation reserved for educational purposes. A more reasoned judgment will apportion the reservations according to the best estimates of needs in specific areas. While these needs do not take the same form as a businessman's interest in having a channel available for commercial purposes, they are nonetheless bona fide requirements which can be supported by educators across the nation.

The most recent national documentation is the NAEB Survey of the Needs of Education for Television Channel Allocations.[2] State and local studies continue to support and reinforce the NAEB findings and demonstrate an even broader need for channel reservations in certain areas. All studies affirm the importance of placing reserved channels where the immediate and potential needs exist regardless of any system of percentages.

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[2] NAEB, Survey of the Needs of Education for Television Channel Allocations, Washington, D.C., 1962.

III

DESCRIPTION OF THE ASSIGNMENT PROCEDURES

The assignment of a television channel to a locality depends upon the needs of that locality, its relationship to other places and their needs, the availability of television channels in that area, the number and frequency of stations already in that area, the location of the antenna, the power with which the station will operate,and the chances of its interfering with other stations on the same or nearby channels in neighboring locations.

Because so many ingredients are necessary, assignment of channels requires the handling of many repetitious data every time an assignment is made. In a manual process, the simple calculation of distance from one locality to another involves locating both places on a map and measuring the distance. Even with pre-cut templates, this process takes time and must be done for each location. When this involves nearly sixteen hundred separate locations, the computer's access to these data in a matter of minutes gives it a clear advantage over the several days or weeks it would take to correlate this information manually.

In order to provide the computer with appropriate information, considerable time was spent devising a priority schedule, a roster of localities which should be considered for assignments, and other pertinent factors. Details of these considerations are listed in the following sections.

LOCATIONS TO BE CONSIDERED

Preparation of material for a computer program designed to assign television channels requires that certain judgments be made in advance about the locations which are to be considered. The computer can not, after all, look at a map and decide on its own what locations will receive television assignments. It can, however, once locations have been selected, store a variety of information about those locations and on the basis of that information and a carefully developed assignment program, determine whether a given location ought to be assigned a given channel.

There were several considerations which resulted in the selection of the 1596 locations. First, it was desirable to have a channel available for educational purposes in every locality which had been listed in the NAEB survey of 1962[3] and all communities which have subsequently expressed an interest in educational television either through an initial state plan which has been developed, or through local or institutional action.

Second, because there was no desire to limit the number of channel assignments which the computer might be able to make, it was felt that consideration must also be given to requests which are likely to be made by commercial applicants.

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[3] Op. cit.

The result of several conferences in which lists of communities were studied and evaluated was the decision that all locations with a population of 10,000 or more would be used as a basic list where the computer would be asked to provide television channels.

However, even this basic list was qualified in three ways. First, several localities with a population of less than 10,000 but with a documented interest in activating an educational television channel were also included. Other localities with a population of less than 10,000 were also included on the basis that they were located in sparsely populated areas not likely to be covered by other facilities. Second, locations with populations above 10,000 were deleted if they were considered to be suburbs of significant population centers. Third, some modification of the list was made by grouping certain communities into what are generally considered "market" areas. Examples of this would be Minneapolis-St. Paul, Albany-Troy, and Norwalk-Stamford. With respect to the existing Table of Assignments, these considerations increased the overall number of locations by nearly two hundred.

It should be emphasized that while selecting localities on the basis of a population cut-off point is not a fully defensible method of operation, neither is it subject to strong criticism. The fact of the matter is that whether the assignment is by digital computer or manual processes, it is necessary to make decisions now about matters that will not really be decided for a number of years. The two fundamental reasons supporting this cut-off figure were:

Using a population cut-off point of 10,000 rather than, say 25,000, provides a larger number of locations, thereby increasing the optimum number of channel assignments which might be made. The population cut-off of 10,000, with the three qualifications metnioned above, also provides a relatively sound basis for assuring nearly complete coverage of the population. In sparsely populated areas not covered in this plan, it is likely that the drop-in of a channel could be made without much difficulty, if this becomes necessary.

All Canadian and Mexican television channel allocations were also considered as locations, although no effort was made to assign channels to these communities. They do, however, affect the overall distribution of frequencies in the United States. For this reason all pertinent agreements between the United States and Canada and Mexico regarding television channel assignments were included in the background material prepared for the computer. This increased the number of locations about which detailed information is available by 263.

POPULATION PRIORITIES

Once the basic locations had been determined, it was necessary to develop a system whereby the computer would be able to determine the basis on which an assignment should be made. In other words, how can the computer program assure that channels will be assigned where they are needed and with some relation to population and assignments in other areas? The priorities were established on the basis of the following general principles.

The list in Table I was used as a guide to the maximum number of channels which the computer would attempt to assign in localities of different populations. In each case, the computer program was designed to consider existing UHF and VHF construction permits and licenses in determining the number of assignments to be made. For example, in a locality with a population between 150,000 and 500,000 with four operating stations, the computer would seek only three additional assignments.

Table I

MAXIMUM CHANNEL ASSIGNMENT REQUESTS ACCORDING TO URBAN AREA POPULATION

	VHF PLUS UHF
Up to 50,000	3
50,000 to 150,000	5
150,000 to 500,000	7
500,000 to 2,000,000	9
2,000,000 to 5,000,000	11
Over 5,000,000	13

In a number of localities, particularly in congested areas, it is important to consider assignments in nearby localities. To accommodate this factor, the following table was integrated into the computer program.

Table II

WEIGHTING SYSTEM TO ALLOW FOR REQUIREMENTS SATISFIED BY SERVICES OTHER THAN THOSE IN GIVEN LOCATIONS

Weight	Separation
1.0	10 Miles or Less
.5	20 Miles or Less
.25	30 Miles or Less

This table was applied in the following way. If the computer were considering assigning to location X, the program requires that it also consider the fact that location Y, 20 miles away, assists to some extent in meeting the requirements which according to Table I are listed for location X. Should there be a need for three channels in location X, and five in location Y, the computer would attempt to make a total of only six assignments between the two locations.

SEPARATION REQUIREMENTS

The computer program was also designed to consider all FCC technical standards.

The co-channel separation requirements for UHF stations vary from 155 miles in Zone I to 205 miles in Zone III. The adjacent channel separation for

UHF stations is 55 miles in all zones. In addition to these requirements, there are additional interference limitations for UHF station assignments called "taboos". The complete table of these constraints is in the FCC Rules and Regulations, Volume 3, September, 1961, Section 3.609 (Zones), Section 3.610 (Separation), and Section 3.698 (Tables--see Table 4).

The computer program also provided for a measure of flexibility in the actual assignment of television channels. The geographical coordinates used for each location were obtained from the Department of Commerce publication, Air Line Distances Between Cities in the United States, whenever possible. In the case of a city not listed in this publication, the co-ordinates of the approximate geographical center were obtained from maps. Actual site co-ordinates were used for operating and authorized (C.P.) stations. The mileage separations were based on these co-ordinates. Since it can not be assured that new stations will locate their transmitting antennas at the reference point, it was necessary to provide some engineered flexibility in the actual calculations on which an assignment was based.

The FCC Rules refer to a 15-mile flexibility, which in practice means that any applicant in a community within 15 miles of the location where a channel is assigned can legitimately apply for the channel. The Rules do not guarantee that a transmitter can be placed 15 miles from the location where the channel is assigned, so the 15-mile "uncertainty" figure is not an engineered flexibility factor.

In any nationwide assignment plan, the matter of station separation is likely to be a concern in only a small number of instances. It is, however, important to give some engineered flexibility, particularly to avoid those occasional situations in which the assigned channels would be so immovable that they or other facilities are adversely affected. Too great an engineered flexibility would be unnecessary in most situations and no engineered flexibility at all would unduly restrict the possibility for some flexibility in locating the transmitter and antenna.

It was agreed that an engineered flexibility factor was desirable; however, rather than using a relatively large figure such as 15 miles, it was felt that a 2-mile radius from the central co-ordinates would provide sufficient distance so that no situation would be without some flexibility for transmitter locations. The 2-mile radius provides a 4-mile minimum flexibility for the actual location of the transmitter. It is particularly important that this be understood as a minimum engineered flexibility for, in reality, the excess of actual mileage between locations, over the required separation distance, will usually be considerably greater.

BASIC CONSTRAINTS

It has already been mentioned that this study has proceeded on the basis of using appropriate FCC Rules and Regulations as well as channel constraints brought about by international agreements with Canada and Mexico.

Further consideration of constraints was made to determine the basic list of facilities which would be considered fixed and immovable. The decision was to use only existing operating facilities and construction permits as the basic list of channels which could not be moved or altered in any way.

This meant that the computer did not begin with the existing Table of Assignments as a part of its program. It was felt that any inefficiencies in that Table would in turn reduce the efficiency of the computer's calculations. Because the existing Table was not used, the same channel numbers which were allocated, but unoccupied, in the current FCC Table of Assignments do not in most cases appear in the NAEB Table, although in nearly every case an assignment of another channel was made.

This will be of particular concern at first to educational organizations which have developed state plans or community efforts in connection with a given channel number or set of channel numbers. On an overall basis there are several points which should be kept in mind. First, in many cases the computer found the same channel number which had previously been assigned to a locality. Second, in a few cases the computer found a higher channel; and third, in the remaining cases the computer was able to locate a lower channel which could be reserved for educational purposes.

RESERVATION OF CHANNELS

Other considerations in the assignment procedure were derived from existing state plans for educational television. To some extent, however, these carefully developed plans do not reflect the total potential of educational need, but only the practical political expediency of having a plan of operation presently accepted and financed by legislative bodies. Therefore, in addition to these plans, NAEB surveys of educational need and other information which demonstrated the importance of reserving channels for educational purposes were also used. The general philosophy which conditioned the reservations in this plan is outlined in the previous section of this report, and insofar as channel availability was not a limitation, the application of that philosophy is reflected in the reservations which have been recommended in the NAEB Table.

There was no particular effort to reserve all low number UHF television channels for educational use. In most cases as preliminary assignment tables were studied and edited, efforts were made to alternate reserved and unreserved channels so that neither potential commercial nor educational licensees would have an excessive number of high or low channels.

In a few instances an unoccupied VHF channel which was provided in the existing Rules of the FCC was designated for reservation. In such instances this channel has been unoccupied for a considerable period of time and educational need suggested the importance of reserving the facility.

IV

CONCLUSIONS

This study has demonstrated the technical and economic feasibility of using digital computer techniques for television channel assignment. Although there is a considerable amount of time necessary to prepare basic input information and computer programs, the actual assignment procedure was conducted in a matter of hours.

The NAEB has not only demonstrated the effectiveness of computer techniques in making an overall assignment, but has indicated a special usefulness because of the ability of the computer to consider specific situations. A practical demonstration of this occurred when the FCC recently announced its decision to delete Channel 37 from the UHF Table for several years. At that point the plan included 27 assignments of Channel 37, and in a matter of a few hours it was possible to delete those assignments and to study a variety of alternatives which could be considered as substitute channels.

The careful effort to prepare full and accurate information as background data for the computer has resulted in a plan which is fully practical on a technical basis and has considered commercial interest in television channel allocations as well as minimum educational needs for television broadcast channels.

The following Table indicates the distribution of the channels which are included in the NAEB assignment plan.

Table III

DISTRIBUTION OF CHANNELS IN THE NAEB ASSIGNMENT PLAN

Number of Locations	1596
Operating[1] Commercial UHF	157
Operating Commercial VHF	474
Operating[1] Educational UHF	45
Operating Educational VHF	56
Assigned Unreserved UHF	1501
Assigned Unreserved[2] VHF	68
Assigned Reserved UHF	864
Assigned Reserved[3] VHF	54

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1. The term operating as used here includes both construction permits and licenses.

2. Includes VHF channels from the existing FCC Rules and Regulations less several which are recommended for reservation in the NAEB plan.

3. Includes VHF channels from the existing FCC Rules and Regulations, as well as several additional reservations requested in the attached NAEB plan.

V

RECOMMENDATIONS

1. On the basis of the assumptions and background presented in this report, the technical precision with which this plan has been developed and the possibilities for further exploration and use of the computer techniques for channel allocations, the NAEB recommends that the Federal Communications Commission adopt the Table of Assignments which is included in this report.

2. In consideration of information already included in this report, the NAEB recommends that the Federal Communications Commission adopt this Table as a new basic Table and that changes proposed for specific locations be based on this Table of Assignments.

3. It is recommended that the Federal Communications Commission adopt the reservations which are listed in the NAEB Table of Assignments, and that the Commission consider the reserved channels in this report as providing only for minimum educational needs. For this reason, it is further recommended that unreserved channels be considered as generally available either to commercial or educational applicants without prejudgment that a number of educational reservations fixed at this time can serve all future educational needs.

4. The NAEB recommends that the Federal Communications Commission accept not only the basic plan which is presented here, but also the recorded data which are available for the Commission's use at any time for whatever modification or further exploration may be desired.

5. Finally, it is recommended that the Federal Communications Commission use this information as the basis for a periodic re-examination and possible re-allocation of the unoccupied channels of the UHF spectrum, and that computer procedures be used to conduct the re-examination and re-allocation.

APPENDIX

DETAILS OF THE ASSIGNMENT PROGRAM

Construct Master File

Program 1: A program was established to construct a magnetic tape file which takes IBM punched cards as input and constructs a magnetic tape file whose format is suitable for use by a number of subsequent channel allocation programs. There are at present approximately 10,000 punched cards which were prepared as input to the master file. The master file includes the following information for each location.

1. Place name
2. State
3. State-city number
4. Serial number
5. Urban population
6. Urban area
7. Educational priority
8. Number of Educational channels required
9. Zone
10. City latitude
11. City longitude
12. Number of operating (licenses and CP's) stations--both UHF and VHF
13. Number of stations presently assigned but not operating

14. For each operating station
    - (a) Channel Number
    - (b) Station Type
    - (c) Power Output
    - (d) Antenna Height
    - (e) Transmitting Tower Latitude
    - (f) Transmitting Tower Longitude
    - (g) Channel Offset

15. For each assigned--but--not--operating station
    - (a) Channel Type
    - (b) Channel Number
    - (c) Channel Offset

Print Master File

Program 2: A program to print the master file in a readily readable form for data checking and as a permanent record of the basic input data.

Update Master File

Program 3: A program to update the information contained in the master file to reflect changes which are constantly being made in the present channel allocation and assignment structure.

Construct Intercity File

Program 4: The intercity file contains all intercity separation information required by the channel allocation program. The construction of the intercity file represents the longest single computation in the total program sequence. Extreme care is always taken with this file because of its importance and complexity.

Selective Printout of the Intercity File

Program 5: A program was established to print out selected portions of the intercity file in a number of different formats to facilitate checking the intercity file itself and subsequent programs which depend upon the intercity file.

Distribute Intercity Into 8 Files

Program 6: The assignment program spends a significant portion of time searching for various cities on the intercity file. In order to speed up the searching process, the intercity file is subdivided into 8 shorter files.

Construct Taboo File

Program 7: Using the master file as input, this program constructs a magnetic tape which contains each channel and city which must be considered as an initial constraint. The operating and C.P. channels within the United States are considered as initial constraints along with every assigned channel within Canada and Mexico. The taboo file is used as input to the Preclusion program which is program 9.

Taboo Printout

Program 8: A program was constructed to print out the taboo file in a format suitable for checking and for general information.

Construct Preclusion

Program 9: The preclusion program uses the taboo file and the intercity file as input to compute those channels which are initially precluded in each city. This file serves as basic input to the assignment program and is constantly updated during the assignment procedure. At any given point, this preclusion file tells which channels can be assigned in any given city.

Preclusion Printout

Program 10: A program was developed to print out the preclusion file in a format suitable for checking purposes.

Construction of Needs

Program 11: A program was developed which details on magnetic tape the "needs" which exist at each location of interest for both reserved and unreserved channels. This program uses the master input file and the intercity file as input. In determining channel requirements for each location, the following items are considered:

1. The UHF and VHF channels which exist within a radius of 30 miles.
2. The educational needs as documented by the NAEB.
3. The urban population

Printout of Needs

Program 12: A program was established to print out the initial channel needs in a format suitable for checking and for general information.

Construct Initial Status

Program 13: An input file is constructed which indicates the status of each location, i.e., whether it is to be considered in the current assignment, whether its needs have been satisfied, etc. This file is updated during the course of an allocation so that the computer will have a past history of what action it has taken concerning each location of interest.

Printout of Initial Status

Program 14: A program was prepared to print out the city status file in a format suitable for checking and general information.

Construct Priority Weights

Program 15: A file containing the weighting for each location of interest is prepared initially and constantly updated during the course of an allocation. The construction of the initial priorities makes use of the master file and the intercity file as inputs. The weights are calculated as a function of the following items:

1. The number and separation of UHF and VHF channels which exist within a radius of 30 miles.

2. The urban population associated with the area.
3. The educational needs of the area as documented by the NAEB.

Priority Printout

Program 16: A program was written to print out the priority file in a format suitable for checking and general information.

Construct Initial Assignment

Program 17: A file which contains all existing UHF and VHF stations is prepared. This file is constantly updated during the course of an allocation. The file includes the type of channel as well as channel number, and represents the basic result of the sequence of computer programs to this point.

Print Allocation

Program 18: A program was developed to print out the complete allocation, including VHF channels as well as UHF channels.

Duplicate Preclusion Tape and Duplicate Assignment File

Program 19,20: The assignment program updates each input file every time a complete allocation for a given channel number is made. If something unforseen should happen during the sequential updating of these files, it might mean returning to the first channel to begin again. Therefore, a backup input tape is made which allows the assignment program to return to the last channel allocated if something should interrupt the allocation of any given channel.

Assignment Program

Program 21: This program is the focal point of the preceding sequences of programs. The assignment program distributes channels according to a relatively complex channel weighting system which involves a three-way negotiation between, (1) the need for a channel, (2) the impact of a given channel assignment upon future assignment possibilities, and (3) good geographical distribution of channels.

The program chooses five cities for any particular assignment and then looks ahead to see the impact of assigning the given channel at each of these five cities. The impact is then weighed against the need for a channel in each of the five cities and one of the five cities is chosen for the assignment.

The computer continues in this manner until all channel assignment possibilities are exhausted or all needs have been satisfied. Although the number of cities whose merits are measured against each other at any one time is variable, five cities has been agreed upon as a desirable and practical figure. The running time of the program is almost directly proportional to the number of cities examined at any given time. Updating of all files is done each time a given channel number has been assigned at all desired places within the United States.

TABLE OF ASSIGNMENTS

The NAEB Table of Assignments is listed alphabetically according to state. For convenience in referring to the channel information, UHF channels are always listed first. Two lines are available for these channels and two lines are available for VHF channels; however, if only one line is needed in either case, only one line will be provided. The channels are divided into four categories as follows:

OPER -- Operating Commercial (Includes Construction Permits)
COMM

OPER -- Operating Educational (Includes Construction Permits)
EDUC

ASGN -- Channels assigned by the computer, and left unreserved
UNRES

ASGN -- Channels assigned by the computer, which are recommended
RES for reservation.

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
ALEXANDER-CITY	ALA			62	
ANDALUSIA	ALA			33 66	14
ANNISTON	ALA				34
AUBURN	ALA			65	44
BESSEMER	ALA				
BIRMINGHAM	ALA	42		83	58 64
		6 13	10		
CULLMAN	ALA			70	
DECATUR	ALA	23			
DEMOPOLIS	ALA			43	18
DOTHAN	ALA			72	17
		4			
DOZIER	ALA			76	
			2		
ENTERPRISE	ALA			36 82	
EUFAULA	ALA			78	
FAYETTE	ALA			77	61
FLORENCE	ALA	15			27
GADSDEN	ALA			21 66	
GUNTERSVILLE	ALA				50
HUNTSVILLE	ALA	19 25 31			48
JASPER	ALA			67	14
MOBILE	ALA		42	48 58 80	19
		5 10			
MONTGOMERY	ALA	20 32	26		
		12			

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
MUNFORD	ALA				40
MT CHEAHA STATE PARK	ALA				
			7		
OPELIKA	ALA				54
OZARK	ALA			56	
SCOTTSBORO	ALA			82	53
SELMA	ALA			24	
		8			
SHEFFIELD	ALA			65	
SYLACAUGA	ALA			75	
TALLADEGA	ALA			46	
THOMASVILLE	ALA			47	27
TROY	ALA			53	
TUSCALOOSA	ALA			22 55	16
TUSCUMBIA	ALA	47			
TUSKEGEE	ALA			81	
UNIVERSITY	ALA				45
AJO	ARIZ			29	23
BISBEE	ARIZ			54 66	
CASA GRANDE	ARIZ			43	
CLIFTON	ARIZ			20	
COOLIDGE	ARIZ			49	
DOUGLAS	ARIZ			60	28
		3			
ELOY	ARIZ			61	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
FLAGSTAFF	ARIZ	9 13		25	16
GLOBE	ARIZ			51	18
HOLBROOK	ARIZ			22	
KINGMAN	ARIZ			22 6	
MESA	ARIZ	12		69	
MIAMI	ARIZ			41	
NOGALES	ARIZ			32 11	
PHOENIX	ARIZ	3 5 10	8	21 27 45	15 39
PRESCOTT	ARIZ			28 38	17
SAFFORD	ARIZ			42	16
TUCSON	ARIZ	4 9 13	6	19 40 70	30
WILLIAMS	ARIZ			36	19
WINSLOW	ARIZ			33	14
YUMA	ARIZ	11 13		72	
ARKADELPHIA	ARK			80	26
BATESVILLE	ARK			46	17
BENTON	ARK			69 82	
BLYTHEVILLE	ARK			24 55	
CAMDEN	ARK			36 61	
CLARKSVILLE-OZARK	ARK			42	20

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
CONWAY	ARK			21	
EL DORADO	ARK	10		36 83	32
FAYETTEVILLE	ARK			36 58	13
FORREST CITY	ARK			58	
FORT SMITH	ARK	5		38 48 67	32
HARRISON	ARK			24	33
HELENA	ARK			45 78	
HOPE	ARK			70	
HOT SPRINGS	ARK	9			31
JACKSONVILLE	ARK			74	
JONESBORO	ARK	8		49	19
LITTLE ROCK	ARK	4 7 11		29 51 57	23 63 2
MAGNOLIA	ARK			28	
MALVERN	ARK			53	
MONTICELLO	ARK			71	14
NEWPORT	ARK			41	
PARAGOULD	ARK			36 68	
PINE BLUFF	ARK			35	
RUSSELLVILLE	ARK				25
SEARCY	ARK			79	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
SPRINGDALE	ARK			30 75	
STUTTGART	ARK			47	
TEXARKANA	ARK				44
ALTURAS	CALIF			17	
				13	
ANTIOCH	CALIF			70	
BAKERSFIELD	CALIF	17 23 29		45	39
		10			
BANNING	CALIF			66 77	
BARSTOW	CALIF			30 47	
BISHOP	CALIF			34	18
BLYTHE	CALIF			34	16
BRAWLEY	CALIF			54 76	26
CHICO	CALIF			18	
		12			
COALINGA	CALIF			31	15
CONCORD	CALIF				
CORONA	CALIF	52			
COTATI	CALIF				36
DELANO	CALIF			27 55	
EL CENTRO	CALIF			60	48
		7 9			
ESCONDIDO	CALIF				
EUREKA	CALIF			15	
		3 6			13
FAIRFIELD	CALIF			42	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
FRESNO	CALIF	24 30 47 53			41
HANFORD	CALIF	21		72	
LANCASTER	CALIF			42 70	
LODI	CALIF			76	
LOMPOC	CALIF			26 48	
LONG-BEACH	CALIF				43
LOS ANGELES	CALIF	22 34 2 4 5 7 9 11 13			16 62 68
MADERA	CALIF			59 75	
MERCED	CALIF			35 57	25
MODESTO	CALIF			48 67	
NAPA	CALIF			78	
NOVATO	CALIF			72	
OCEANSIDE	CALIF			69	
ONTARIO	CALIF				
OXNARD	CALIF			65	
PALM SPRINGS	CALIF			46 83	28
PETALUMA	CALIF			24	
PITTSBURG	CALIF			80	
POMONA	CALIF				
PORT CHICAGO	CALIF				

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
PORTERVILLE	CALIF			19 77	
PORT-HUENEME	CALIF			38	
REDDING	CALIF			20	14
		7		9	
RIVERSIDE	CALIF			36	40
SACRAMENTO	CALIF	40		29 50	23
		3 10	6		
SALINAS-MONTEREY	CALIF			28 34 73	18
		8			
SAN BERNARDINO	CALIF	18	24	72	
SAN BUENAVENTURA	CALIF			71	
SAN DIEGO	CALIF			27 75	15 39
					63
		3 10			
SANFRANCISCO-OAKLAND	CALIF	20 32 44			62 74
		2 4 5	9		
		7			
SAN JOSE	CALIF			22 54	16 38
					64
		11			
SAN LUIS OBISPO	CALIF			50	
		6			
SAN MATEO	CALIF		14		
SANTA-ANA	CALIF			74	64
SANTA BARBARA	CALIF			20 36 61	14
		3			
SANTA CRUZ	CALIF			26 83	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
SANTA MARIA	CALIF			32 58 12	
SANTA PAULA	CALIF			44	25
SANTA ROSA	CALIF			52	15
SEASIDE	CALIF			51	
STOCKTON	CALIF	13		46 58	19
TRACY	CALIF				
TULARE	CALIF			66	
UKIAH	CALIF			27 33	17
VACAVILLE	CALIF			68	
VENTURA	CALIF			81	
VISALIA	CALIF	43			49
WATSONVILLE	CALIF			60	
WOODLAND	CALIF				
YREKA CITY	CALIF			29	19
YUBA CITY	CALIF			21 31	
ALAMOSA	COLO			24 3	18
BOULDER	COLO			58	18 12
CANON CITY	COLO			27	
COLORADO SPRINGS	COLO	11 13		22 43	16
CORTEZ	COLO			21	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
CRAIG	COLO			22	16
DELTA	COLO			32	
DENVER	COLO	2 4 7 9	6	14 47	26 36
DURANGO	COLO	6		31	19
FORT COLLINS	COLO			39 64	
FORT MORGAN	COLO			33	20
GRAND JUNCTION	COLO	5		35	14
GREELEY	COLO			45 74	23
GUNNISON	COLO			29	20
LA JUNTA	COLO			31	15
LAMAR	COLO	12		34	18
LEADVILLE	COLO			28	17
LONGMONT	COLO			42 68	
LOVELAND	COLO			55 80	
MONTROSE	COLO	10		51	23
PUEBLO	COLO	5		19 35 48	8
SALIDA	COLO			46	25
STERLING	COLO	3		28 38	17

2

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
TRINIDAD	COLO			32 42	14
WALSENBURG	COLO			40	
ABINGTON	CONN				50
BRIDGEPORT	CONN	43	71		
BRISTOL	CONN				
DANBURY	CONN				
GREENWICH	CONN				
GROTON	CONN				
HARTFORD	CONN	18 3	24		
LITCHFIELD	CONN				76
MERIDEN	CONN				46
MIDDLETOWN	CONN				
NEW BRITAIN	CONN	30			
NEW HAVEN	CONN	59 8			
NEW LONDON	CONN				26
NORWICH	CONN		63		
STAMFORD-NORWALK	CONN				81
TORRINGTON	CONN				
WATERBURY	CONN	20			
WILLIMANTIC	CONN				
DOVER	DEL				66

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
MILFORD	DEL				44
MILLSBORO	DEL			38	28
WILMINGTON	DEL			83	54
			12		
WASHINGTON	DC	14	26	78	48
		4 5 7			
		9			
BARTOW	FLA			20	
BELLE GLADE	FLA			42	
BOCA RATON	FLA				73
BRADENTON	FLA			28 69	18
CLEARWATER	FLA			56 77	
COCOA	FLA			61	24
DAYTONA BEACH	FLA			71	
		2			
DE LAND	FLA			49 83	
DELRAY BEACH	FLA			82	
EAU-GALLIE	FLA			48	
FORT LAUDERDALE	FLA			44 54 64	33
FORT MYERS	FLA			39	26
		11			
FORT PIERCE	FLA			30 68	14
FORT-WALTON-BEACH	FLA			34 50	
GAINESVILLE	FLA			42 54	
			5		

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
HOMESTEAD	FLA			60	15
JACKSONVILLE	FLA			14 36	23 52
		4 12	7		
JACKSONVILLE-BEACH	FLA			62 82	
KEY WEST	FLA			14 20	
LAKE CITY	FLA			46	34
LAKELAND	FLA				59
LAKE WALES	FLA			78	
LARGO	FLA			67	
LEESBURG	FLA			5[illegible]	21
MADISON	FLA			68	28
MARIANNA	FLA			74	23
MELBOURNE	FLA			70	
MIAMI	FLA	23	17	41 76	35 52
		4 7 10	2	6	
NEW SMYRNA BEACH	FLA				19
OCALA	FLA			33 60	17
ORLANDO	FLA			43 65	15 53
		6 9			
PALATKA	FLA			44	25
PANAMA CITY	FLA			55	21
		7 13			
PENSACOLA	FLA	15		61	25
		3			
PERRY	FLA			40	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
PLANT-CITY	FLA			75	
QUINCY	FLA			63	
SAINT AUGUSTINE	FLA			31 41	
SANFORD	FLA				27
SARASOTA	FLA			50 79	
TALLAHASSEE	FLA			45 79	19
			11		
TAMPA-ST. PETERSBURG	FLA	38		22	16
		8 13	3	10	
VERO BEACH	FLA			58	
WARRINGTON	FLA			38 67	
WEST PALM BEACH	FLA			36 62	25 46
		5 12			
WINTER-HAVEN	FLA			32	
ALBANY	GA			51 70	18
		10			
AMERICUS	GA			41	
ASHBURN	GA			80	29
ATHENS	GA			60 72	20
			8		
ATLANTA	GA	36	30	47	17 76
		2 5 11			
AUGUSTA	GA			52 75	23
		6 12			
BAINBRIDGE	GA			39	
BRUNSWICK	GA			20 39	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
CARROLLTON	GA			68	
CARTERSVILLE	GA				
CEDARTOWN	GA			79	
CHATSWORTH	GA		18		
COCHRAN	GA			64	21
COLUMBUS	GA		28	15 73	52
		3 9			
CORDELE	GA			59	
DALTON	GA			59	35
DAWSON	GA				31
DOUGLAS	GA				27
DRAKETOWN	GA				38
DUBLIN	GA			33	24
FITZGERALD	GA			61	
FORT VALLEY	GA			83	
GAINESVILLE	GA			39	
GRIFFIN	GA			55	
LA GRANGE	GA			71	
MACON	GA			67	58
		13			
MARIETTA	GA			63	
MILLEDGEVILLE	GA			42	
MOULTRIE	GA			57	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
NEWNAN	GA			74	
PELHAM	GA				47
ROME	GA			57	
SAVANNAH	GA			15 32 48	26
		3 11	9		
SMYRNA	GA				
STATESBORO	GA			44	
THOMASTON	GA			25	
THOMASVILLE	GA				
		6			
TIFTON	GA			35	
VALDOSTA	GA			38	
VIDALIA	GA			56	
WARMSPRINGS	GA				49
WARNER-ROBINS	GA			77	
WAYCROSS	GA			22	16
			8		
WRENS	GA			78	14
BLACKFOOT	IDA			26	14
BOISE	IDA			36	14
		2 7			4
BURLEY	IDA			42	17
CALDWELL	IDA			38	20
				9	
COEURDALENE	IDA			29 54	23

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
EMMETT	IDA			26	
FILERJEROMETWINFALLS	IDA				15
GOODING	IDA			21	
GRANGEVILLE	IDA			28	22
IDAHO FALLS	IDA			43	22
		3 8			
KELLOGG	IDA			51	
LEWISTON	IDA			65	20
		3			
MOSCOW	IDA			40 71	31
					12
MOUNTAIN HOME	IDA			18	
NAMPA	IDA			57	
		6		12	
PAYETTE	IDA			32	
POCATELLO	IDA			38	20
		6 10			
PRESTON	IDA			40	19
REXBURG	IDA			34	16
RUPERT	IDA			33	
TWIN FALLS	IDA				
		11 13			
SANDPOINT	IDA			63	34
WALLACE	IDA			72	18
WEISER	IDA			60	16

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
ALTON	ILL			76	
AURORA	ILL				
BELLEVILLE	ILL			78	
BELVIDERE	ILL				
BENTON	ILL			59	53
BLOOMINGTON	ILL	15			62
CANTON	ILL				
CARBONDALE	ILL		8	41 51	25
CARPENTERSVILLE	ILL				
CENTRALIA	ILL			29 57	
CHAMPAIGN-URBANA	ILL	33 3	12		65
CHARLESTON	ILL			44	
CHICAGO	ILL	26 32 44 2 5 7 9	11		14 53
DANVILLE	ILL	24			
DECATUR	ILL	17		54 73	38
DE KALB	ILL				63
DIXON	ILL			58	
EFFINGHAM	ILL				34
ELGIN	ILL			42	
FREEPORT	ILL				

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
GALESBURG	ILL			60	49
HARRISBURG	ILL			75	
		3			
JACKSONVILLE	ILL			45 66	22
JOLIET	ILL			74	
KANKAKEE	ILL			69	23
KEWANEE	ILL			81	
LA SALLE	ILL	35			
LINCOLN	ILL				
LITCHFIELD	ILL				18
MACOMB	ILL			47	14
MARION	ILL			31	
MATTOON	ILL			71	
MONMOUTH	ILL			72	
MT VERNON	ILL			47 77	23
MUNDELEIN	ILL				
NAPERVILLE	ILL				
NEWTON	ILL			68	55
NORMAL	ILL			83	
OLNEY	ILL				26
OTTAWA	ILL			79	
PEKIN	ILL				
PEORIA	ILL	19 25 31 43			52

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
PERU	ILL				
QUINCY	ILL			50	
		10			
RANTOUL	ILL			75	
ROCK-FALLS	ILL			30	
ROCKFORD	ILL	39		80	17
		13			
SPRINGFIELD	ILL	20		64 70 82	42
STERLING	ILL			71	
STREATOR	ILL				41
VANDALIA	ILL				21
WAUKEGAN	ILL			76	55
WOOD-RIVER	ILL				
ZION	ILL				
ANDERSON	IND				80
BEDFORD	IND			70	
BLOOMINGTON	IND				25
		4			
COLUMBUS	IND			82	
CONNERSVILLE	IND				
CRAWFORDSVILLE	IND			51	
ELWOOD	IND				
EVANSVILLE	IND	14 50		69 80	30
		7			9

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
FORT WAYNE-ROANOKE	IND	15 21 33			27 68
FRANKFORT	IND			60	
GARY	IND			50 66	20
GOSHEN	IND				
GREENSBERG	IND				23
HAMMOND	IND			82	
HARTFORD CITY	IND				76
HUNTINGTON	IND				
INDIANAPOLIS	IND			29 57 77	19 47
		6 8 13			
JASPER	IND				20
KOKOMO	IND				39
LAFAYETTE	IND	18			30
LA-PORTE	IND			56	
LOGANSPORT	IND			78	
MADISON	IND			64	43
MARION	IND	31			52
MICHIGAN CITY	IND				
MUNCIE	IND	49			55
NEW CASTLE	IND				
PERU	IND			58	
PRINCETON	IND				46
RENSSELAER	IND				48

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
RICHMOND	IND				53
SALEM	IND				54
SEYMOUR	IND			45	
SHELBYVILLE	IND			17	
SOUTHBEND-ELKHART	IND	16 22 28		61	40
SULLIVAN	IND				16
TERRE HAUTE	IND			63 81	27
		2 10			
VALPARAISO	IND				
VINCENNES	IND			52	22
WABASH	IND				
WASHINGTON	IND			72	
ALGONA	IA			68	40
AMES	IA			72	26
		5			
ATLANTIC	IA			53	
BOONE	IA			45 82	
BURLINGTON	IA			[illegible]	[illegible]
CARROLL	IA			70	29
CEDAR FALLS	IA				46
CEDAR RAPIDS	IA			42	20
		2 9			
CENTERVILLE	IA			54	
CHARLES CITY	IA			41 67	23

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
CHEROKEE	IA			73	16
CLINTON	IA			40	28
COUNCIL BLUFFS	IA			71	25
CRESTON	IA			74	18
DAVROCKISLMOLINEILL	IA			36 77	18 68
		4 6 8			
DECORAH	IA				25
DES MOINES	IA			35 47 76	24
		8 13	11		
DUBUQUE	IA			32 38 70	22
ESTHERVILLE	IA			79	32
FAIRFIELD	IA			63	
FORT DODGE	IA	21			
FORT MADISON	IA			39	
GRAETTINGER	IA				19
GRINNELL	IA				
IOWA CITY	IA			16	65
					12
KEOKUK	IA			23 80	
KNOXVILLE	IA			64	
LE MARS	IA			57	
MARSHALLTOWN	IA			43	
MASON CITY	IA			71	15
		3			

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
MUSCATINE	IA				
NEWTON	IA			56	
OELWEIN	IA			78	
ONAWA	IA			54	28
OSKALOOSA	IA			52	
OTTUMWA	IA			34	17
RED OAK	IA			77	20
SHENANDOAH	IA			61	
SIOUX CITY	IA	4 9		[illegible]1	22
SPENCER	IA			52	
STORM LAKE	IA			62	
WASHINGTON	IA				44
WATERLOO	IA	7		33 69 75	14 59
WEBSTER CITY	IA				49
ABILENE	KAN			45	
ARKANSAS CITY	KAN			65	
ATCHISON	KAN			60	
CHANUTE	KAN			31 79	15
COFFEYVILLE	KAN			53	
COLUMBUS	KAN				35
CONCORDIA	KAN			24	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
DODGE CITY	KAN				16
EL DORADO	KAN			38 75	
ELLSWORTH	KAN			53	25
EMPORIA	KAN			48	20
ENSIGN	KAN			44	
		6			
EUREKA	KAN			69	26
FORT SCOTT	KAN			55	
GARDEN CITY	KAN			24 33	
		11			13
GOODLAND	KAN			29	
		10			
GRAINFIELD	KAN			32	15
GREAT BEND	KAN			55	
		2			
HAYS	KAN			36	
		7			
HOWARD	KAN				43
HUTCHINSON	KAN			76	28
		12			8
INDEPENDENCE	KAN			63	
IOLA	KAN			61	
JUNCTION CITY	KAN			18 72	
LAKIN	KAN			14 52	
					3
LARNED	KAN			27	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
LAWRENCE	KAN			62	
LEAVENWORTH	KAN			78	
LIBERAL	KAN			22 42	
LINCOLN-CENTER	KAN			14 66	
					9
MCPHERSON	KAN			22	
MANHATTAN	KAN			29 82	
			8		
NEWTON	KAN			51	
OAKLEY	KAN			41	21
OLATHE	KAN			80	
OTTAWA	KAN			32	
PARSONS	KAN			27	
PHILLIPSBURG	KAN			38	20
PITTSBURG	KAN			57	
		7			
PRAIRIE-VILLAGE	KAN				
PRATT	KAN			23	
RUSSELL	KAN			31	
SALINA	KAN	34		74	
SEDAN	KAN				71
TOPEKA	KAN			40 50	23
		13			11
WELLINGTON	KAN			67	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
WICHITA	KAN			30 59	17 46
		3 10			
WINFIELD	KAN			49	
ASHLAND	KY	59			23
BOWLING GREEN	KY			29	17
		13			
CORBIN	KY	16		53	
COVINGTON	KY				26
CYNTHIANA	KY			78	
DANVILLE	KY			35	
ELIZABETHTOWN	KY			67	38
FRANKFORT	KY			81	
GLASGOW	KY			34 57	
HAZARD	KY			55	24
HENDERSON	KY				24
HOPKINSVILLE	KY			60	
LEXINGTON	KY	18 27		60	39
LOUISVILLE	KY	21 32 41	15	83	62 73
		3 11			
MADISONVILLE	KY			42	19
MAYFIELD	KY			32 63	
MAYSVILLE	KY			72	
MIDDLESBORO	KY			47 76	
MOREHEAD	KY				29

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
MURRAY	KY			79	21
NEWPORT	KY	74			
OWENSBORO	KY			48	
PADUCAH	KY				
		6			
PIKEVILLE	KY			63	45
RICHMOND	KY			51	
SOMERSET	KY			71	22
WINCHESTER	KY			69	
ABBEVILLE	LA			67	
ALEXANDRIA	LA			47	26
		5			
BASTROP	LA			60 77	
BATON ROUGE	LA			53 75	15 66
		2 9			
BOGALUSA	LA			49 73	
COVINGTON	LA			70	32
CROWLEY	LA			46	27
DE RIDDER	LA			68	18
DONALDSONVILLE	LA			79	31
EUNICE	LA			78	
FRANKLIN	LA			83	
HAMMOND	LA			41	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
HOUMA	LA	11		74	
JENNINGS	LA			56	
LAFAYETTE	LA	3 10			58
LAKE CHARLES	LA	7		38 44	22 62
MANSFIELD	LA			65	41
MINDEN	LA			45 75	20
MONROE	LA	8	13	21 42	
MORGAN CITY	LA			77	21
NATCHITOCHES	LA			43	24
NEW IBERIA	LA			48	25
NEW ORLEANS	LA	20 4 6 12	8	54 82	29
OPELOUSAS	LA			36	17
RUSTON	LA			64	16
SHREVEPORT	LA	3 12		25 67	15 54
SLIDELL	LA				24
SULPHUR	LA			72	
TALLULAH	LA			81	34
THIBODAUX	LA			57	
AUBURN	ME			58 68	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
AUGUSTA	ME		10	27 66	
BANGOR	ME	2 5		43 7	16
BAR HARBOR	ME			20	
BATH	ME			19 74	
BELFAST	ME			25	
BIDDEFORD	ME			76	
CALAIS	ME			55	15 13
CARIBOU	ME			53	
DOVER	ME			34	
FORTKENT	ME			17	
HOULTON	ME			24	
LEWISTON	ME	8			
MILLINOCKET	ME			32	
ORONO	ME		12	65	22
PORTLAND	ME	6 13		23 45 55	17 36
PRESQUE ISLE	ME	8	10	73	19
RUMFORD	ME			63	
SACO	ME				
SKOWEGAN	ME			38	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
WATERVILLE	ME			14	
ANNAPOLIS	MD				70
BALTIMORE	MD	24 2 11 13		75	18 53
CAMBRIDGE	MD			50	20
CUMBERLAND	MD			60	23
FREDERICK	MD			81	59
GAITHERSBURG	MD				
HAGERSTOWN	MD				31
LOWER MARLBORO	MD				42
OLNEY	MD				
SALISBURY	MD	16		32	22
WESTMINSTER	MD				65
AMHERST	MASS				
ATTLEBORO	MASS				
BOSTON	MASS	38 56 4 5 7	2	25	44 69
BROCKTON	MASS				
EASTHAMPTON	MASS				
FALL RIVER	MASS				82
FITCHBURG	MASS				
GARDNER	MASS				
GLOUCESTER	MASS			35	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
GREENFIELD	MASS	32			
HAVERHILL	MASS				
LAWRENCE	MASS			77	
LEOMINSTER	MASS				
LOWELL	MASS				
LYNN	MASS				
MARLBORO	MASS				
NEW BEDFORD	MASS			33	21
		6			
NEWBURYPORT	MASS			65	
NORTH ADAMS-ADAMS	MASS	19			70
NORTHAMPTON	MASS				
PEABODY	MASS				
PITTSFIELD	MASS	64			
SALEM	MASS				
SPRINGFIELD-HOLYOKE	MASS	22 40			68
TAUNTON	MASS				
WILLIAMSTOWN	MASS				
WORCESTER	MASS	14		60	27
ADRIAN	MICH				
ALBION	MICH				
ALMA	MICH				27

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
ALPENA	MICH			21 11	6
ANN ARBOR	MICH			60	26
BAD AXE	MICH			28	15
BATTLE CREEK	MICH			29	23
BAY CITY	MICH	5		25	
BENTON HARBOR	MICH			83	77
BIG RAPIDS	MICH				52
CADILLAC	MICH	9		32	26
CALUMET	MICH			28	
CHEBOYGAN	MICH	4		50	
DETROIT	MICH	20 50 2 4 7	56		76
EAST LANSING	MICH				
ESCANABA	MICH			35 45 3	24
FLINT	MICH	12		73	16
GRAND-HAVEN	MICH				
GRAND RAPIDS	MICH	8 13		35 63 75	17
HOLLAND	MICH			41	
HOUGHTON	MICH			40	22

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
IRON MOUNTAIN	MICH			51 8	15
IRONWOOD	MICH			29 39 12	16
JACKSON	MICH			34 47 69	18
KALAMAZOO	MICH	3		72	45
LANSING	MICH	6		51	39
MANISTEE	MICH			60	20
MANISTIQUE	MICH			48	14
MARQUETTE	MICH	6		32 13	26
MENOMINEE	MICH			33 61	
MIDLAND	MICH			49 61	
MONROE	MICH				
MOUNT-CLEMENS	MICH				
MOUNT PLEASANT	MICH		14	55	
MUSKEGON	MICH			54	15
NILES	MICH				
OWOSSO	MICH			79	
PARMA-ONONDAGA	MICH	10			
PETOSKEY	MICH			39	17
PONTIAC	MICH			44	22

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
PORT HURON	MICH				
SAGINAW	MICH	57		67	19
SAULT STE MARIE	MICH			34 66	28
		10		8	
ST-JOSEPH	MICH				
TRAVERSE CITY	MICH			29 42	23 71
		7			
WEST BRANCH	MICH			59	31
YPSILANTI	MICH				
ALBERT LEA	MINN			44 77	
ALEXANDRIA	MINN			49	
		7			
APPLETON	MINN			22	
					10
AUSTIN	MINN				31
		6			
BEMIDJI	MINN			20 39	
				9	
BRAINERD	MINN			32 41	21
CLOQUET	MINN			36	
CROOKSTON	MINN			26	
DETROIT LAKES	MINN			38	
DULUTH	MINN			57	17
		3 6 10			8
ELY	MINN			44	24
EVELETH	MINN			40	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
FAIRMONT	MINN			42	
FARIBAULT	MINN			54	
FERGUS FALLS	MINN			27 57	14
GRAND RAPIDS	MINN			48	18
HASTINGS	MINN			72	
HIBBING	MINN			65	
		13			
HUTCHINSON	MINN			46	
INTERNATIONAL FALLS	MINN				
					11
LITTLE FALLS	MINN			19	
MANKATO	MINN			50 80	18
		12			
MARSHALL	MINN			53	
MINNEAPOLIS ST PAUL	MINN			43	26 56
		4 5 9	2		
		11			
MONTEVIDEO	MINN			28	
MOORHEAD	MINN			60	35
NEW ULM	MINN			30 76	
NORTHFIELD	MINN				20
OWATONNA	MINN			48	
PIPESTONE	MINN			69	23
RED WING	MINN			60	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
ROCHESTER	MINN				36
		10			
ST CLOUD	MINN			29 62	16
STILLWATER	MINN			66	
THIEF RIVER FALLS	MINN			31	
				10	
VIRGINIA	MINN			28 74	15
WALKER	MINN			30	
		12			
WILLMAR	MINN			33 75	24
WINONA	MINN			47 73	17
WORTHINGTON	MINN			74	14
BILOXI	MISS			60	40 78
		13			
BOONEVILLE	MISS			73	38
BROOKHAVEN	MISS			33	
CANTON	MISS			68	
CLARKSDALE	MISS			56	18
CLEVELAND	MISS			43	15
COLUMBIA	MISS				16
COLUMBUS	MISS				35
		4			
CORINTH	MISS			17	
GREENVILLE	MISS			48	27

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
GREENWOOD	MISS	6			40
GRENADA	MISS			52	
GULFPORT	MISS			51	
HATTIESBURG	MISS			44 71	28
HOLLY SPRINGS	MISS				34
INDIANOLA	MISS			65	
JACKSON	MISS	25 3 12		50 72	38 63
KOSCIUSKO	MISS				19
LAUREL-PACHUTA	MISS	7			
LELAND	MISS			76	
LOUISVILLE	MISS			54	
MCCOMB	MISS			45	14
MATHISTON	MISS				32
MERIDIAN	MISS	30 11			21
NATCHEZ	MISS			35	23
NEW ALBANY	MISS			81	51
NEWTONDECATUR	MISS			46	
PASCAGOULA	MISS			69	22
PHILADELPHIA	MISS			66	
PICAYUNE	MISS			62	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
SARDIS	MISS				39
STARKVILLE	MISS			74	
STATE COLLEGE	MISS			41	
					2
TUPELO	MISS			57	29
		9			
UNIVERSITY	MISS				62
VICKSBURG	MISS			55	22
WEST POINT	MISS				
YAZOO CITY	MISS			59	17
BIRCH TREE	MO			34	18
BOWLING GREEN	MO			56	24
CAPE GIRARDEAU	MO			61	
		12			
CARROLLTON	MO			46	16
CARTHAGE	MO			39 82	
CARUTHERSVILLE	MO			44	
CHILLICOTHE	MO			38	
COLUMBIA	MO			53	59
		8			
FARMINGTON	MO			38	
FLAT RIVER	MO			62	16
FULTON	MO			75	43
HANNIBAL	MO			69	
		7			

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
JEFFERSON CITY	MO	13		31	25
JENNINGS	MO				
JOPLIN	MO	12			29
KANSAS CITY	MO	4 5 9	19	52 58	42 68
KING CITY	MO			41	22
KIRKSVILLE	MO	3		57	
LA PLATA	MO			79	15
LEBANON	MO			44	
LOWRY CITY	MO			45	17
MARSHALL	MO			71	26
MARYVILLE	MO			51	
MEXICO	MO			33	
MOBERLY	MO				20
NEVADA	MO			66	
POPLAR BLUFF	MO	15		52	26
ROLLA	MO			27 48	14
ST-CHARLES	MO				
ST JOSEPH	MO	2		30 39	14
ST LOUIS	MO	2 4 5 11	9	40 49 67	28 58

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                             OPER    OPER    ASGN     ASGN
                             COMM    EDUC    UNRES    RES

                          .         .      .         .
SEDALIA             MO    .         .      .76       .
                          . 6       .      .         .
                          .         .      .         .
SIKESTON            MO    .         .      .20 74    .
                          .         .      .         .
SPRINGFIELD         MO    .         .      .28 56    .22
                          . 3 10    .      .         .
                          .         .      .         .
WARRENSBURG         MO    .         .      .21       .
                          .         .      .         .
ANACONDA            MONT  .         .      .47       .29
                          .         .      . 2       .
                          .         .      .         .
BILLINGS            MONT  .         .      .21 40    .15
                          . 2  8    .      .         .11
                          .         .      .         .
BOZEMAN             MONT  .         .      .14 23 41 .
                          .         .      .         . 9
                          .         .      .         .
BUTTE               MONT  .         .      .57       .20
                          . 4       .      . 6       . 7
                          .         .      .         .
CUT BANK            MONT  .         .      .20       .14
                          .         .      .         .
DEER LODGE          MONT  .         .      .38       .
                          .         .      .         .
DILLON              MONT  .         .      .24       .15
                          .         .      .         .
GLASGOW             MONT  .         .      .25       .15
                          .         .      .         .
GLENDIVE            MONT  .         .      .23       .17
                          . 5       .      .         .
                          .         .      .         .
GREAT FALLS         MONT  .         .      .28 34    .17
                          . 3  5    .      .         .
                          .         .      .         .
HARDIN              MONT  .         .      .27       .18
                          .         .      . 4       .
                          .         .      .         .
HAVRE               MONT  .         .      .35       .16 26
                          .         .      . 9 11    .
                          .         .      .         .
HELENA              MONT  .         .      .51       .18
                          .12       .      .10       .
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		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
KALISPELL	MONT			35 44	15
				9	
LAUREL	MONT			31	
LEWISTOWN	MONT			19	
				13	
LIVINGSTON	MONT			32	
MILES CITY	MONT			22 28	16
				3 10	6
MISSOULA	MONT			27	16
		13		8	11
SHELBY	MONT			23	
SIDNEY	MONT			21	
WHITEFISH	MONT			55	26
WOLF POINT	MONT			33	20
ALBION	NEB			35	14
				8	
ALLIANCE	NEB			14 24	
					13
BASSETT	NEB			15 28	
					7
BEATRICE	NEB			16 63	
BROKEN BOW	NEB			26	
CHADRON	NEB			20	
COLUMBUS	NEB			19 55	
FAIRBURY	NEB			21	
FALLS CITY	NEB			33	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
FREMONT	NEB			36 75	
GRAND ISLAND	NEB			23 52	
		11			
HARTINGTON	NEB			80	33
HASTINGS	NEB			57	
		5			
HAY SPRINGS	NEB			41	
		4			
HAYES CENTER	NEB			27	
		6			
KEARNEY	NEB			39	17
		13			
LEXINGTON	NEB			22 45	
					3
LINCOLN	NEB			44 79	27
		10	12		
MCCOOK	NEB			19	
		8			
NEBRASKA CITY	NEB			69	
NORFOLK	NEB			30 59	
NORTH PLATTE	NEB			16 25 44	
		2			9
OMAHA	NEB			31	15 48
		3 6 7			
SUPERIOR	NEB				
				4	
ORD	NEB			58	18

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
SCOTTSBLUFF	NEB			30	
		10			
WAYNE	NEB			76	24
YORK	NEB			46	
BOULDER CITY	NEV			32	
				4	
CARSON CITY	NEV			26	
ELKO	NEV			20	14
				10	
ELY	NEV			15	
				3	6
FALLON	NEV			20	14
GOLDFIELD	NEV			16	
				5	
HAWTHORNE	NEV			27	15
HENDERSON	NEV			26 48	
LAS VEGAS	NEV			20 54	14
		2 8 13			10
LOVELOCK	NEV			18	
MCGILL	NEV			21	
				8	
RENO	NEV			22 43	16
		4 8		2	5
TONOPAH	NEV			25	
				9	
WINNEMUCCA	NEV			19	
				7	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
BERLIN	NH			24 41	18
CLAREMONT	NH			53	
CONCORD	NH				15
DOVER	NH				
DURHAM	NH				
			11		
HANOVER	NH				28
KEENE	NH			73	51
LACONIA	NH			34	
LITTLETON	NH			52	46
MANCHESTER	NH				81
		9			
NASHUA	NH				
PORTSMOUTH	NH			47	
ROCHESTER	NH			57	
ANDOVER	NJ				
ASBURY PARK	NJ	58			69
ATLANTIC CITY	NJ	46		64 74	33
BRIDGETON	NJ				62
BURLINGTON	NJ				
CAMDEN	NJ				
EATONTOWN	NJ				
FREEHOLD	NJ				80

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
HAMMONTON	NJ				
LINDEN	NJ	47			
LONG-BRANCH	NJ			36	
MADISON	NJ				
MILLVILLE	NJ				
MONTCLAIR	NJ				75
MORRISTOWN	NJ				
NEWARK	NJ				
			13		
NEW BRUNSWICK	NJ		19		
PATERSON-UP MONTCLR	NJ				
PHILLIPSBURG	NJ				
POINT-PLEASANT	NJ				
PRINCETON	NJ				
RED-BANK	NJ				
TRENTON	NJ			41	63
VINELAND	NJ			72	
ALAMOGORDO	NM			26 35	16
ALBUQUERQUE	NM			14 36	20
		6 7 13	5		
ARTESIA	NM			15 31	
ATRISCO-FIVE POINTS	NM			30 42	
BELEN	NM			24	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
CARLSBAD	NM			36	19
		6			
CLAYTON	NM			36	20
CLOVIS	NM			43	
		12			
DEMING	NM			33	
FARMINGTON	NM			15 39	
				12	
GALLUP	NM			18 28	
				3 10	8
GRANTS	NM			16 26	
HATCH	NM			22 46	
					12
HOBBS	NM			38 50	
LAS CRUCES	NM			38 54	14
LAS VEGAS	NM			21	15
LORDSBURG	NM			23	
LOS ALAMOS	NM			17 33	
LOVINGTON	NM			32 56	20
PORTALES	NM			14 25 52	
					3
RATON	NM			53	23
ROSWELL	NM				
		8			10
SANTA FE	NM			25	
		2 11			9

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
SILVER CITY	NM			15 45	
				6	10
SOCORRO	NM			48	19
TRUTH OR CONSEQUENCE	NM			49	17
TUCUMCARI	NM			39	19
ALBANY-TROY	NY			29 42	23
		13			
AMSTERDAM	NY			83	
AUBURN	NY				
BATAVIA	NY			67 79	29
BEACON	NY				
BINGHAMTON	NY	34 40	46	68	62
		12			
BOONLOWVILLE	NY			76	20
BUFFALO	NY		17 23		
		2 4 7			
CARTHAGE	NY				
		7			
CORTLAND	NY				
DUNKIRK	NY				76
ELMIRA-CORNING	NY	18		42 66	24
ENDICOTT	NY				
FULTON	NY				
GENEVA	NY			55	
GLENS FALLS	NY			39 67	21

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
GLOVERSVILLE	NY				47
HEMPSTEAD	NY				53
HORNELL	NY			75	45
HUDSON	NY				
ILION	NY				
ITHACA	NY		14	64	
JAMESTOWN	NY				60
JOHNSTOWN	NY			58	
KINGSTON	NY			54	
LAKE PLACID	NY			55	45
		5			
LOCKPORT	NY				
MALONE	NY				66
MASSENA	NY			77	14
MIDDLETOWN	NY				
NEWARK	NY				
NEWBURGH	NY				
NEW YORK	NY	31	25		
		2 4 5			
		7 9 11			
OGDENSBURG	NY			24	18
OLEAN	NY				54
ONEIDA	NY				
ONEONTA	NY			52	36

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
OSWEGO	NY			72	
PATCHOGUE	NY			77	49
PLATTSBURG	NY				49
POUGHKEEPSIE	NY			65	48
RIVERHEAD	NY			55	
ROCHESTER	NY		21	27 83	33
		8 10 13			
SARANAC LAKE	NY				27
SARATOGA-SPRINGS	NY				
SCHENECTADY	NY		17		
		6			
SYRACUSE	NY		43	74	80
		3 5 9			
UTICA-ROME	NY			25 41 71	15
				82	
		2			
VAIL MILLS	NY				
		10			
WATERTOWN	NY			50 70	16
WILLIAMSVILLE	NY				
AHOSKIE	NC			49	
ALBEMARLE	NC			60	
ASHEVILLE	NC	62		49 79	21 73
		13			
BOONE	NC				46
BURLINGTON	NC				

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
CHAPEL HILL	NC			27	
			4		
CHARLOTTE	NC	36	42	80	18 58
		3 9			
CLINTON	NC				34
COLUMBIA	NC			30	19
CONCORD	NC				
DURHAM	NC			75	63 81
		11			
ELIZABETH CITY	NC			36 52	17
ENFIELD	NC				41
FAYETTEVILLE	NC			62	21
FRANKLIN	NC			83	27
GASTONIA	NC				70
GOLDSBORO	NC			67 79	16
GREENSBORO	NC				30 51
		2			
GREENVILLE	NC			70	
		9			
HALIFAX	NC				29
HENDERSON	NC			65	
HENDERSONVILLE	NC				
HICKORY	NC				14
HIGH POINT	NC			17	
		8			

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
JACKSONVILLE	NC			28 58	18
KANNAPOLIS	NC				
KINSTON	NC			38	22
LAURINBURG	NC				
LENOIR	NC			78	
LEXINGTON	NC				
LUMBERTON	NC			50 66	23
MARION	NC				41
MONROE	NC				
MOUNT AIRY	NC			69	22
NEW BERN	NC			47	
		12			
RALEIGH	NC			54	43
		5			
RED SPRINGS	NC				44
REIDSVILLE	NC				
ROANOKE RAPIDS	NC			57	20
ROCKY MOUNT	NC			59	
SALISBURY	NC			68	39
SANFORD	NC			72	
SHELBY	NC				16
SLADESVILLE	NC			35	14
STATESVILLE	NC				20

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
TARBORO	NC				
THOMASVILLE	NC				
WASHINGTON	NC			76	
		7			
WILMINGTON	NC			45 55 61	15 26
		3 6			
WILSON	NC			46	25
WINSTON-SALEM	NC			77	47 56
		12			
BISMARCK	ND			26	17
		5 12			3
BOTTINEAU	ND			40	31
DEVILS LAKE	ND			14	
				8	
DICKINSON	ND			24	14
		2			4
ELLENDALE	ND			32	19
FARGO	ND			44 66	25
		6 11	13		
GRAND FORKS	ND			15 53	
		10			2
JAMESTOWN	ND			29 39	18
				7	
LISBON	ND			48	23
MINOT	ND			15 43	
		10 13			6
PEMBINA	ND			59	
		12			

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
RUGBY	ND			20	
VALLEY CITY	ND			56	
		4			
WAHPETON	ND			68	17
WILLISTON	ND			30	18
		8		11	
AKRON	OHIO	49		29	23
ALLIANCE	OHIO				
ANSONIA	OHIO				44
ASHLAND	OHIO				
ASHTABULA	OHIO	15			43
ATHENS	OHIO		20	36 76	
BELLEFONTAINE	OHIO				75
BOWLING GREEN	OHIO		70	59	
BRUNSWICK	OHIO				
BRYAN	OHIO				43
BUCYRUS	OHIO				
CAMBRIDGE	OHIO			52	26
CANTON	OHIO			61	
CHILLICOTHE	OHIO			67	25
CINCINNATI	OHIO		48	61	
		5 9 12			
CIRCLEVILLE	OHIO				

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
CLEVELAND	OHIO	3 5 8		41	25 51
COLUMBUS	OHIO	4 6 10	34	47	56
CONNEAUT	OHIO				
COSHOCTON	OHIO				77
DAYTON-XENIA	OHIO	22 2 7		42	16
DEFIANCE	OHIO			64	
DELAWARE	OHIO				
DOVER	OHIO				
EAST-LIVERPOOL	OHIO				
ELYRIA	OHIO				
FINDLAY	OHIO			19	
FOSTORIA	OHIO			81	
FREMONT	OHIO				
GALION	OHIO				
GREENVILLE	OHIO			71	
HAMILTON-MIDDLETOWN	OHIO				
HILLSBORO	OHIO				50
KENT	OHIO				17
LANCASTER	OHIO				
LIMA	OHIO	35		62	24
LORAIN	OHIO			57	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
MANSFIELD	OHIO				31
MARIETTA	OHIO			68	55
MARION	OHIO				83
MASSILLON	OHIO				
MOUNT VERNON	OHIO				
NEWARK	OHIO		28	80	
NEW-PHILADELPHIA	OHIO				
NORWALK	OHIO			54	
OXFORD	OHIO		14		
PIQUA	OHIO				
PORTSMOUTH	OHIO			46 70	19
RAVENNA	OHIO				
SALEM	OHIO				
SANDUSKY	OHIO				78
SIDNEY	OHIO				
SPRINGFIELD	OHIO			79	66
STEUBENVILLE	OHIO				79
TIFFIN	OHIO			65	
TOLEDO	OHIO		30		48
		11 13			
TROY	OHIO				
URBANA	OHIO				
VAN-WERT	OHIO				

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
WADSWORTH	OHIO				
WARREN	OHIO			67	
WASHINGTON	OHIO			38	
WOODSFIELD	OHIO				42
WOOSTER	OHIO				
YOUNGSTOWN	OHIO	21 27 39 45			79
ZANESVILLE	OHIO	18			38
ADA	OKLA	10		77	39
ALTUS	OKLA			22 46	16
ALVA	OKLA			50	18
ANADARKO	OKLA			76	
ARDMORE	OKLA	12		50 74	17
BARTLESVILLE	OKLA			21	
BLACKWELL	OKLA			41	
CHICKASHA	OKLA			33	
CLAREMORE	OKLA			72	
CLINTON	OKLA			26 63	
DUNCAN	OKLA			27	
DURANT	OKLA			42	26
ELK CITY	OKLA	8		34	28

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
EL RENO	OKLA			31	
ENID	OKLA	5			14 62
FREDERICK	OKLA			71	
GUTHRIE	OKLA			82	
GUYMON	OKLA			30	17
HOBART	OKLA			38	
HOLDENVILLE	OKLA				
HUGO	OKLA			39	24
LAWTON	OKLA	7		38 66	19 49
MCALESTER	OKLA			22 51	16
MIAMI	OKLA			47	18
MUSKOGEE	OKLA			40	19
NORMAN	OKLA				47 76
OKLAHOMA CITY	OKLA	6 9	29 13	37 73	36
OKMULGEE	OKLA			28 56	
PAULS VALLEY	OKLA			30	
PONCA CITY	OKLA			34	24
POTEAU	OKLA			43	15
PRYOR CREEK	OKLA			83	
SAPULPA	OKLA			64 80	
SEMINOLE	OKLA			89	

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                                           OPER          OPER        ASGN          ASGN
                                           COMM          EDUC        UNRES         RES

                                      *             *           *             *
SHAWNEE                        OKLA   *             *           *60           *20
                                      *             *           *             *
STILLWATER                     OKLA   *             *           *52           *33 70
                                      *             *           *             *
TULSA                          OKLA   *23           *           *             *66
                                      * 2   6   8   *11         *             *
                                      *             *           *             *
VINITA                         OKLA   *             *           *74           *
                                      *             *           *             *
WOODWARD                       OKLA   *             *           *21           *15
                                      *             *           *             *
ALBANY                         ORE    *             *           *41 79        *
                                      *             *           *             *
ASHLAND                        ORE    *             *           *39           *21
                                      *             *           *             *
ASTORIA                        ORE    *             *           *28 61        *18
                                      *             *           *             *
BAKER                          ORE    *             *           *21 34        *
                                      *             *           *             *
BEND                           ORE    *             *           *26 63        *18
                                      *             *           *             *
BROOKINGS                      ORE    *             *           *27           *17
                                      *             *           * 8           *
                                      *             *           *             *
BURNS                          ORE    *             *           *20           *15
                                      *             *           *             *
COOS BAY                       ORE    *             *           *32           *
                                      *11           *           *             *
                                      *             *           *             *
COQUILLE                       ORE    *             *           *44           *26
                                      *             *           *             *
CORVALLIS                      ORE    *             *           *30           *37
                                      *             * 7         *             *
                                      *             *           *             *
EUGENE                         ORE    *             *           *29           *19
                                      *  9 13       *           *             *
                                      *             *           *             *
GRANTS PASS                    ORE    *             *           *23 65        *
                                      *             *           *             *
KLAMATH FALLS                  ORE    *             *           *42           *16
                                      * 2           *           *             *
                                      *             *           *             *
LA GRANDE                      ORE    *             *           *26           *18
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		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
LEBANON	ORE				19
MCMINNVILLE	ORE			82	30
MEDFORD	ORE	 5 10		48	
NEWPORT	ORE			62	
NORTH BEND	ORE			50	20
PENDLETON	ORE			14 51	
PORTLAND	ORE	27 2 6 8 12	 10	32 78	14 36
ROSEBURG	ORE	 6		28	
SALEM	ORE			34 78	17 60
SPRINGFIELD	ORE			39	
THE DALLES	ORE			22 66	16
ALIQUIPPA	PA				
ALLENTOWN	PA	67			79
ALTOONA	PA	 10		32 84	36
BEAVER-FALLS	PA				
BETHLEHEM	PA	31			
BLOOMSBURG	PA			30	
BRADFORD	PA			28	
BUTLER	PA				
CANNONSBURG	PA				

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
CARBONDALE	PA				
CARLISLE	PA				
CHAMBERSBURG	PA			47	
CHESTER	PA				
CLEARFIELD	PA			41	
					5
COATESVILLE	PA				
COLUMBIA	PA				
CONNELLSVILLE	PA				
DONORA	PA				
DU BOIS	PA			62	
EASTON	PA	37			
ELLWOOD-CITY	PA				
ERIE	PA	39 66			26 68
		12			
FARRELL	PA				
GREENSBURG	PA				
HANOVER	PA				
HARRISBURG	PA	21 27 71			33
HAZELTON	PA				
INDIANA	PA			76 83	
JENKINTOWN	PA				
JOHNSTOWN	PA	19		80	23
		8			

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
LANSDALE	PA				
LATROBE	PA			14	
LEBANON-LANCASTER	PA	15 8			
LEWISTOWN	PA			82	
LOCK HAVEN	PA	32		69	
MEADVILLE	PA			56	
MONESSEN	PA				
MOUNT-CARMEL	PA				
NEW-CASTLE	PA				
OIL CITY	PA			39	
PHILADELPHIA	PA	17 23 29 3 8 10	35		45
PHOENIXVILLE	PA				
PITTSBURG	PA	22 53 2 4 11	16 13		71
POTTSTOWN	PA				
POTTSVILLE	PA				
READING	PA	61			79
SCRANTON	PA	16 22 44		70	34
SHAMOKIN	PA				77
SHARON	PA				
SHENANDOAH	PA				
STATE COLLEGE	PA			38	33

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
SUNBURY	PA				
TAMAQUA	PA				
UNIONTOWN	PA				
WARREN	PA			65	31
WASHINGTON	PA			75	
WAYNESBORO	PA				
WILKES-BARRE	PA	28			38
WILLIAMSPORT	PA			20	
YORK	PA	43 69			
NEWPORT	RI				
PAWTUCKET	RI				
PROVIDENCE	RI	16		72	64
		10 12			
WARWICK	RI				
WOONSOCKET	RI				
AIKEN	SC				46
ANDERSON	SC	40			66
BAMBERGDENMARKBARNWL	SC			17	
BENNETTSVILLE	SC				
CAMDEN	SC				
CHARLESTON	SC			22 28 40	16
		2 6 5	7		
CLEMSON	SC				50

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
COLUMBIA	SC	19 25 10		65	35 59
CONWAY	SC			69	14
FLORENCE	SC	13			33
GAFFNEY	SC			74	
GEORGETOWN	SC			24 49	
GREENVILLE	SC	6	29	45 82	71
GREENWOOD	SC				69
LANCASTER	SC			76	
LAURENS	SC				53
MYRTLE BEACH	SC			20 55	
NEWBERRY	SC				43
ORANGEBURG	SC			34 63	27
ROCK HILL	SC				64
SPARTANBURG	SC	7			52
SUMTER	SC			37	31
UNION	SC			48	
ABERDEEN	SD	9		36	16
BELLE FOURCHE	SD			42	23
BROOKINGS	SD			15 48 71	8

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
FLORENCE	SD			54	
		3			
FREEMAN	SD			77	43
HOT SPRINGS	SD			38	15
HURON	SD			44	34
				12	
LEAD	SD			31 48	
		5		11	
MADISON	SD			66	21
MITCHELL	SD			31 47	25
		5			
MOBRIDGE	SD			21	15
PIERRE	SD			23 33	14
					10
RAPID CITY	SD			64	
		3 7			9
RELIANCE	SD			46	
		6			
SIOUX FALLS	SD			39 61	17 27
		11 12			
STURGIS	SD			34	19
VERMILLION	SD			67	31
			2		
WATERTOWN	SD			26 82	20
				3	
WINNER	SD			40	19
YANKTON	SD				49

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
ATHENS	TENN			43	14
BRISTOLTENNBRISTOLVATENN		 5			57
CHATTANOOGA	TENN	 3 9 12		41 69 78	24 51
CLARKSVILLE	TENN			58	16
CLEVELAND	TENN			81	
COLUMBIA	TENN			26	
COOKEVILLE	TENN			74	33
CROSSVILLE	TENN			77	46
DYERSBURG	TENN			14 80	
ELIZABETHTON	TENN				67
FAYETTEVILLE	TENN				72
GALLATIN	TENN			55	
GREENEVILLE	TENN			19	
HUMBOLT	TENN			82	22
JACKSON	TENN	 7			33
JOHNSON CITY	TENN	 11			38
KINGSPORT	TENN			28	
KNOXVILLE	TENN	26 6 10			56
LAWRENCEBURG	TENN			36	
LEBANON	TENN			68	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
LEXINGTON	TENN			43	11
MCMINNVILLE	TENN			40	
MARYVILLE	TENN				75
MEMPHIS	TENN	3 5 13	10	28 67	16 50
MORRISTOWN	TENN			17	
MURFREESBORO	TENN			30	20
NASHVILLE	TENN	4 5 8	2	28	39
OAK RIDGE	TENN				63
PARIS	TENN			34	
PULASKI	TENN			36	
SHELBYVILLE	TENN			32	
SNEEDVILLE	TENN				2
SPRINGFIELD	TENN				
TULLAHOMA	TENN			80	
UNION CITY	TENN				
ABILENE	TEX	9		23 36 55	17
ALICE	TEX			30	26
ALPINE	TEX	12		35	
AMARILLO	TEX	4 7 10		45	2

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
ANDREWS	TEX			44 62	
ATHENS	TEX			79	16
AUSTIN	TEX	24 67			48 73
					83
		7			
BALLINGER	TEX			45 57	
BAY CITY	TEX			43	21
BAYTOWN	TEX			23	
BEAUMONT	TEX				34 50
		4 6 12			
BEEVILLE	TEX			56 74	30
BIG SPRING	TEX			51	30
		4			
BONHAM	TEX			83	
BOQUILLAS	TEX			19 29	
				8	
BORGER	TEX			27 40	
BRADY	TEX			47	15
				13	
BRECKENRIDGE	TEX			53	33
BRENHAM	TEX			17	
BROWNFIELD	TEX			26 63	
BRNSVLLE-HARLGN-WSL	TEX			48 60 78	23
		4 5			
BROWNWOOD	TEX			39	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
BRYAN	TEX			26 54	15
		3			
CANYON	TEX			51	18
CENTER	TEX			49 76	
CHILDRESS	TEX			20	14
CLARKSVILLE	TEX				14
CLEBURNE	TEX			78	
COLEMAN	TEX			26 77	
COLLEGE-STATION	TEX				36
COLORADO CITY	TEX			54	19
COLUMBUS	TEX			52	64
CONROE	TEX			35	
CORPUS CHRISTI	TEX	22		38	34 47
					68
		3 6 10			
CORSICANA	TEX				
CROCKETT	TEX			28	
CRYSTAL CITY	TEX			54 64	44
CUERO	TEX			35	
DALHART	TEX			16 26 38	
DALLAS	TEX	29		56	35 80
		4 8	13		
DEL RIO	TEX			24 52	18
				10	
DENISON	TEX			61	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
DENTON	TEX				82 2
DUMAS	TEX			29 48	
EAGLE PASS	TEX			13 76	
EDINBURG	TEX			82	70
EL CAMPO	TEX			27	
EL PASO	TEX	4 9 13		72	30 62 7
FALFURRIAS	TEX			31 69	
FORT STOCKTON	TEX			5	17
FORT WORTH	TEX	5 11		31 52 64	18 40
FREEPORT	TEX			39	
GAINESVILLE	TEX			48	
GALVESTON	TEX			31 51 63	14 42
GONZALES	TEX				16
GRAHAM	TEX			70	24
GREENVILLE	TEX			38	
HENDERSON	TEX			27	
HEREFORD	TEX			41 61	35
HILLSBORO	TEX				
HOUSTON	TEX	39 2 11 15	8	61	33 71
HUNTSVILLE	TEX			45	20

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
JACKSONVILLE	TEX			57	
JASPER	TEX				40
KERMIT	TEX			22 66	
KERRVILLE	TEX			31	19
KILGORE	TEX			31	
KILLEEN	TEX			30 51	
KINGSVILLE	TEX			66	
LAMESA	TEX			26 71	
LAMPASAS	TEX			42	21
LAREDO	TEX	8		39 61 13	27 55
LEVELLAND	TEX			36 69	
LITTLEFIELD	TEX			17 65	
LONGVIEW	TEX			75	
LUBBOCK	TEX	11 13	5	21 59 75	47 53
LUFKIN	TEX	9			
MCALLEN	TEX			52	
MCKINNEY	TEX				
MARFA	TEX			42 3	21
MARSHALL	TEX			46	17
MERCEDES	TEX				

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
MEXIA	TEX			22 63	
MIDLAND	TEX	18		67	60
		2			
MINERAL WELLS	TEX			28	
MISSION	TEX			76	
MONAHANS	TEX			49	
		9			
MOUNT PLEASANT	TEX			55	
NACOGDOCHES	TEX	19			30
NEW BRAUNFELS	TEX			75	
ODESSA	TEX			46 78	27
		7			
ORANGE	TEX			60	
PALESTINE	TEX			32	
PAMPA	TEX			32 56	23
PARIS	TEX			71	
PASADENA	TEX			80	
PECOS	TEX			25 41	14
PERRYTON	TEX			55	19
PHARR	TEX				
PLAINVIEW	TEX			15 57	
PORT ARTHUR	TEX			70	
PORT LAVACA	TEX			65	

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
PRESIDIO	TEX			26	
				7	
RAYMONDVILLE	TEX			20 44	
RICHARDSON	TEX		23		
ROBSTOWN	TEX			76	
ROSENBERG	TEX			82	
SAN ANGELO	TEX			30 61	16 23
		3 8		6	
SAN ANTONIO	TEX	41		62 78	29 53
		6 3 12	9		
SAN BENITO	TEX				
SAN MARCOS	TEX			18	
SEGUIN	TEX			37	
SEMINOLE	TEX			16 28	
SHERMAN	TEX				43
SNYDER	TEX			48 63	42
SONORA	TEX			16 33	
				11	
STEPHENVILLE	TEX			81	20
SULPHUR SPRINGS	TEX				33
SWEETWATER	TEX			73	
		12			
TAYLOR	TEX			46 70	
TEMPLE	TEX				74
		6			

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                                   OPER       OPER      ASGN       ASGN
                                   COMM       EDUC      UNRES      RES
                                *          *          *          *
      TERRELL          TEX      *          *          *42        *
                                *          *          *          *
      TEXARKANA        TEX      *          *          *36 66 72  *18 50
                                * 6        *          *          *
                                *          *          *          *
      TEXAS-CITY       TEX      *          *          *69        *
                                *          *          *          *
      TYLER            TEX      *          *          *21 38     *
                                * 7        *          *          *
                                *          *          *          *
      UVALDE           TEX      *          *          *36 72     *20
                                *          *          *          *
      VERNON           TEX      *          *          *41        *
                                *          *          *          *
      VICTORIA         TEX      *          *          *38        *29
                                *          *          *          *
      WACO             TEX      *          *          *25 63     *16 34
                                *10        *          *          *
                                *          *          *          *
      WAXAHACHIE       TEX      *          *          *60        *
                                *          *          *          *
      WEATHERFORD      TEX      *          *          *72        *
                                *          *          *          *
      WICHITA FALLS    TEX      *          *          *21        *15 64
                                * 3   6    *          *          *
                                *          *          *          *
      ZAPATA           TEX      *          *          *49        *43
                                *          *          *          *
      BEAVER           UTAH     *          *          *26        *20
                                *          *          *          *
      BRIGHAM          UTAH     *          *          *45 51     *
                                *          *          *          *
      CEDAR CITY       UTAH     *          *          *22        *16
                                *          *          * 5        *
                                *          *          *          *
      EPHRAIM-MANTI    UTAH     *          *          *25        *19
                                *          *          *          *
      ESCALANTE        UTAH     *          *          *24        *14
                                *          *          *          *
      LOGAN            UTAH     *          *          *29 57     *
                                *          *12        *          *
                                *          *          *          *
      MOAB             UTAH     *          *          *34        *18
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		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
MONTICELLO	UTAH			38	16
OGDEN	UTAH		10 8	27 39 61	
OREM	UTAH			39 71	
PRICE	UTAH			46 6	13
PROVO	UTAH		11	35 47 60	16 61
RANDOLPH	UTAH			49	21
RICHFIELD	UTAH			17 13	23
ST GEORGE	UTAH			28	18
SALT LAKE CITY	UTAH	2 4 5	7	69	43 63
SPANISH FORK	UTAH			22	
TOOELE	UTAH				14
VERNAL	UTAH			20 3	17
BARRE	VT			16	
BENNINGTON	VT				
BRATTLEBORO	VT				
BURLINGTON	VT	5		74	33
MONTPELIER	VT			72	
NEWPORT	VT			20 83	
RUTLAND	VT			75	26

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
ST ALBANS	VT				
ST JOHNSBURY	VT				22
WINDSOR	VT				42
BLACKSBURG	VA				44
CHARLOTTESVILLE	VA			52	23
COVINGTON	VA			38 70	
DANVILLE	VA	24			33
FARMVILLE	VA			40	23
FREDERICKSBURG	VA			48	30
FRONT ROYAL	VA				38
HARRISONBURG	VA	3			27
HOPEWELL	VA				
LEXINGTON	VA			76	19
LYNCHBURG	VA	13		28 64	13
MARION	VA				33
MARTINSVILLE	VA			26	
NEWPTNEWSHAMPTON	VA	33 13	13	76 60	61
NORFOLK-PORTSMOUTH	VA	27 3 10			39 76
NORTON	VA				13
PETERSBURG	VA	8			

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
PULASKI	VA			30	
RICHMOND	VA			36 71 77	21 67 38
		6 12			
ROANOKE	VA			46 82	48 76
		7 10			
STAUNTON	VA			46 83	17
SUFFOLK	VA			33	
VIRGINIA BEACH	VA			83	
WAYNESBORO	VA			36	
WILLIAMSBURG	VA				51
WINCHESTER	VA			36	
ABERDEEN	WASH			38 63	20
ANACORTES	WASH			76	64
BELLINGHAM	WASH				70
		12			
BREMERTON	WASH				36
CENTRALIA	WASH			83	67
CLARKSTON	WASH			49 81	
ELLENSBURG	WASH			63	39
EPHRATA	WASH			26 52	
EVERETT	WASH			43 66	21
GRAND COULEE	WASH			46	16
HOQUIAM	WASH			49	26

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
KELSO	WASH				51
LONGVIEW	WASH			48	
MOSES LAKE	WASH			36 58	17
OLYMPIA	WASH			44	13
OMAK-OKANOGAN	WASH			38	18
PASCO KENNEWICK	WASH	19		70	32
PORT ANGELES	WASH			22	16
PULLMAN	WASH		10		24
PUYALLUP	WASH				
RICHLAND	WASH	25		80	42
SEATTLE	WASH	4 5 7	9	26 63	33
SPOKANE	WASH	2 4 6		32 42 78	21 7
STEVENSVILLE	WASH			72	30
TACOMA	WASH	11 13	56 62	78	
TOPPENISH	WASH			27 48	
VANCOUVER	WASH			30	
WALLA WALLA	WASH			48 33 64	27
WENATCHEE	WASH			56 76	28 30
YAKIMA	WASH	23 29	47		
BECKLEY	WVA	4		72	16

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
BLUEFIELD	WVA			[illegible]	[illegible]
		6			
CHARLESTON	WVA	[illegible]		[illegible] [illegible]	[illegible] [illegible]
		8			
CLARKSBURG	WVA				[illegible]
		[illegible]			
COWEN	WVA			[illegible]	
ELKINS	WVA			[illegible] [illegible]	[illegible]
FAIRMONT	WVA				[illegible]
HUNTINGTON	WVA			[illegible] [illegible]	[illegible]
		3 13			
LEWISBURG	WVA				[illegible]
MARTINSBURG	WVA				[illegible]
MORGANTOWN	WVA			[illegible]	[illegible]
MOUNDSVILLE	WVA			[illegible]	
PARKERSBURG	WVA	[illegible]			[illegible]
ROMNEY	WVA				
WEIRTON	WVA				[illegible]
WESTON	WVA				[illegible]
		2			
WHEELING	WVA				[illegible]
WHITE SULPHUR SPRINGS	WVA			[illegible]	[illegible]
		7 9			
WILLIAMSON	WVA			[illegible]	[illegible]
ADAMS	WIS			[illegible]	[illegible]

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
ANTIGO	WIS			31 52	
APPLETON	WIS				25
ASHLAND	WIS			27 49	
BEAVER DAM	WIS			69	48
BELOIT	WIS				
CHILTON	WIS				50
CHIPPEWA-FALLS	WIS			34 64	
EAU CLAIRE	WIS				28
		13			
FOND DU LAC	WIS			56 79	
GREEN BAY	WIS				22
		2 5 11			
JANESVILLE	WIS				67
KAUKAUNA	WIS				
KENOSHA	WIS				64
LA CROSSE	WIS			57 81	35 63
		8			
MADISON	WIS	15 27	21	72	43
		3			
MANITOWOC	WIS			47	19
MARINETTE	WIS			43 70	27
MARSHFIELD	WIS			14 30	
MENOMONIE	WIS			55	
MENASHA	WIS			77	

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		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
MERRILL	WIS			62	
MILWAUKEE	WIS	18 24	36	59	46
		4 6 12	10		
MONROE	WIS				61
NEENAH	WIS			44	
OSHKOSH	WIS			66	16
PARK FALLS	WIS			58	19
PLATTEVILLE	WIS			83	
PORTAGE	WIS			45	
PRAIRIE DU CHIEN	WIS				19
RACINE	WIS				34
RHINELANDER	WIS			21 41	
RICHLAND CENTER	WIS				51
RIVER FALLS	WIS				38
SHEBOYGAN	WIS			68	28
SHELL LAKE	WIS			61	22
STEVENS POINT	WIS			42	
TWO-RIVERS	WIS			38	
VIROQUA	WIS				29
WATERTOWN	WIS				
WAUSAU	WIS			71	18
		7 9			
WISCONSIN RAPIDS	WIS			65	53

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
BUFFALO	WYO			14 33	
CASPER	WYO			18 28	
		2			6
CHEYENNE	WYO			51	19
		5			
CODY	WYO			29 47	38
DOUGLAS	WYO			26	
EVANSTON	WYO			23 67	
GILLETTE	WYO			30 41	24
GREEN RIVER	WYO			26 42	
LANDER	WYO			24	15
				4	
LARAMIE	WYO			21 27	15
					8
LUSK	WYO			34	16
NEWCASTLE	WYO			50	21
POWELL	WYO			57	20
RAWLINS	WYO			25	14
				11	
RIVERTON	WYO			35	
		10			
ROCK SPRINGS	WYO			32 48	20
				13	
SHERIDAN	WYO			23 39	17
				7 12	
THERMOPOLIS	WYO			43	16

		OPER COMM	OPER EDUC	ASGN UNRES	ASGN RES
TORRINGTON	WYO			40	22
WORLAND	WYO			46	19